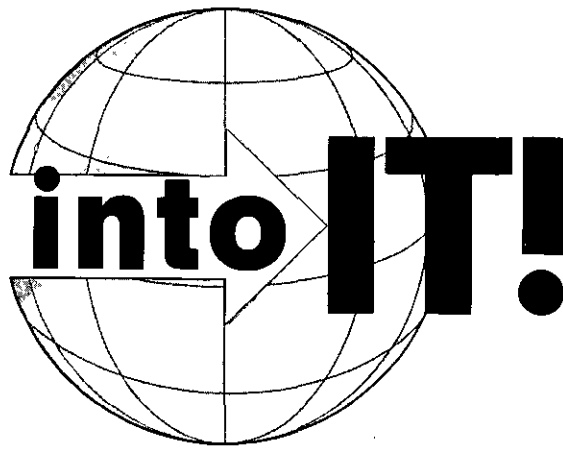


January 1995

Issue 1



The Intosai IT Journal

THIS ISSUE

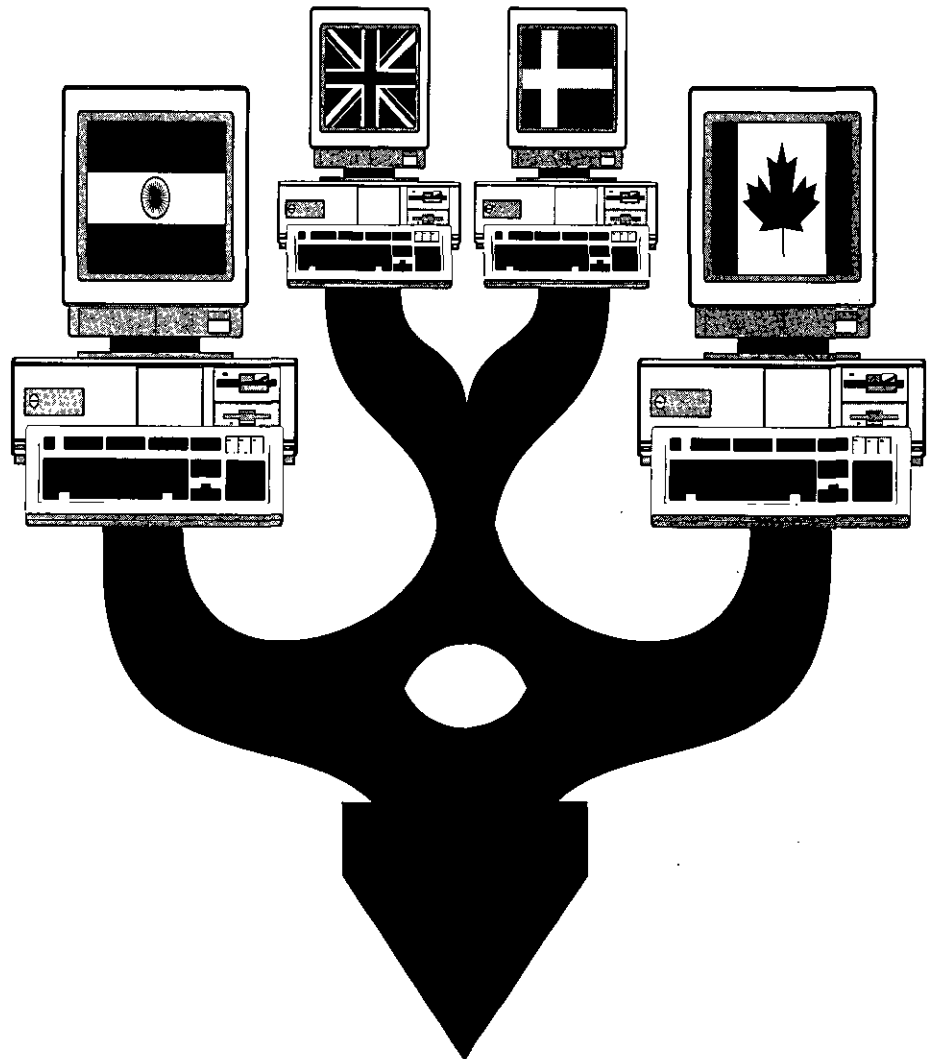
IT in India

Use of IDEA in
Sweden

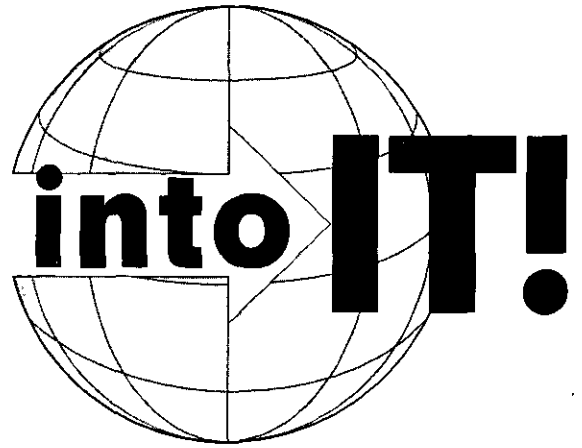
Text Retrieval
in the UK

The Canadian
Audit Briefcase

News from SAIs
around the world



intoIT is here!



Contents

Editorial	2
Country Focus - India	4
The use of IDEA in the Swedish National Audit Office	9
Text Retrieval in the UK National Audit Office	12
The OAG Audit Briefcase	16
News from around the World	21

Welcome to the first edition of *intoIT*, the IT journal of the INTOSAI EDP Committee. The journal will be published twice a year, and the aim is to provide an interesting mix of news, views and comment on the use of IT in SAls around the world.

The Editor would welcome unsolicited articles on relevant topics, preferably accompanied by a photograph and short biography of the author, and short news items for inclusion in future issues.

Contributions should be sent to Roger Goacher, Associate Director, National Audit Office, 157-197 Buckingham Palace Road, London SW1W 9SP, United Kingdom.

Editorial



The Chairman of the INTOSAI EDP Committee, the Comptroller and Auditor General of India, Mr C G Somiah, details the purpose and work of the Committee and the aims of this Journal.

Introduction

Few technologies in recent times have impacted on auditors the way that computers have. Their increasing user-friendliness and rapid advancement provide auditors with opportunities that cannot be ignored and challenges that cannot be wished away. Powerful desktop and portable computers provide auditors with the opportunity to audit more extensively than ever before and more cost-effectively too. At the same time, the exponential growth in computing power that is harnessed by auditees poses challenges to the auditors to find new methodologies for effective auditing.

Managing any change is difficult; the problem is compounded when technology advances so rapidly that a technology is nearly obsolete even before it is properly assimilated or harnessed. Supreme Audit Institutions (SAIs) the world over have been facing this problem in varying degrees and it is perhaps this fact that found expression in the XIII INCOSAI in Berlin in 1989 in a decision to establish an INTOSAI Standing Committee on EDP Audit.

The INTOSAI Standing Committee on EDP Audit

The Committee was formed in 1992 to support SAIs in developing their knowledge and skills in the use and audit of information technology, by providing information and facilities for exchange of experiences, and by encouraging bilateral and regional co-operation. It is widely acknowledged that SAIs are in different stages in the use and audit of IT and therefore they will have differing perceptions of their needs and may need assistance in different forms. This diversity is reflected in the composition of the Committee, which comprises SAIs with varying levels of EDP expertise. They are India (Chairman), Austria, Barbados,

Canada, Cuba, Ecuador, France, Japan, Kiribati, Kuwait, the Russian Federation, Sweden, United Kingdom and Zimbabwe.

The Committee's Aims

The functional guidelines of the Committee, as approved by the XIV INCOSAI in Washington in October 1992 envisage that the Committee shall strive to:

- a) support and promote the development and transfer of knowledge;
- b) bring out an EDP Audit Directory on the basis of members contributions;
- c) promote discussion, development and dissemination of standards and guidelines among the members, and encourage bilateral and regional co-operation and exchange of experience;
- d) promote local and regional training activities; and
- e) assist individual SAIs in locating expertise within member countries for bilateral exchange.

Work Programme

At its first meeting in Washington in October 1992, the Committee decided that its aims would be best pursued by operating through three working groups with the following broad areas of operation:

Group I (Canada, France, Kuwait and Cuba) "Auditing of EDP based accounting systems and EDP support in auditing".

Group II (Sweden, Ecuador, Japan and Kiribati) "Performance audit of the use of EDP systems".

Group III (United Kingdom, Barbados, Zimbabwe and Russian Federation) "The use of EDP in the SAIs own administration".

The Committee met in Ottawa in October 1993 to consider the action plans prepared by the three working groups, and to identify projects, establish priorities and establish work plans for each project. Having regard to the resources that SAIs can mobilise and the cost-benefit ratios of the projects, the following projects have been taken up by the Committee:

- Develop an EDP Audit Training Curriculum suited to varying levels of IT absorption in SAIs.
- Develop a guide on Information Technology Strategies. This "good practices guide" will assist SAIs in evolving IT Strategies and deciding how to use the services of experts.
- Produce an Information Technology Journal that will be a vehicle of communication covering the full range of the Committee's work.
- Prepare a "Guide on Funding". The guide will include a directory of potential funding institutions and their requirements for providing aid.
- Complete the "Information System Security Review Methodology" referred to the Committee by the Conference of Commonwealth Auditors General in September 1993. A two-tier approach will enable SAIs with lesser IT skills also to conduct IS Security Reviews.
- Prepare an exposure draft on the audit of Electronic Data interchange (EDI) and Electronic Authorisation and Access (EAA). This will address an issue that is growing in importance in most advanced countries.
- Develop a single, easily distributable information base on "Performance Auditing of the use of IT Systems".
- Organise a seminar on "Future-Risks and Opportunities in the field of IT Perform-

ance Auditing". The purpose of this project is to:

- i) garner the diverse experiences of SAIs in coping with the increasing use of IT in Government agencies in terms of its impact on audit methodologies skills, etc; and
 - ii) compile and disseminate knowledge about this area.
- Prepare an EDP Directory based on a survey of all the INTOSAI members.

The Committee will be meeting in August 1994 in India to take stock of progress and review the documents produced by then.

Importance of the Journal

The choice of projects reflects the Committee's concern to hasten the transfer of knowledge from IT-experienced SAIs to the others, while at the same time providing stimulus to IT-skilled SAIs to make forays into newer areas. Learning from one another's experiences and working together in new areas are easily the most productive forms of advancing IT knowledge and skills. While Conferences and Seminars will aid this process, a special Journal brought out at regular intervals is likely to be a more enduring institutionalised arrangement for bringing relevant information in a timely fashion to the doorsteps of SAIs.

intoIT is the first IT publication dealing exclusively with IT in SAIs. In this maiden edition, we have endeavoured to give you a varied menu-information about the Committee, IT strategy of an SAI, different types of audit tools and news from member countries. We hope you find them useful. The Committee's main objective is to facilitate the development of IT knowledge and skills in SAIs by providing information and facilities for exchange of experiences. *intoIT* will hopefully be a major vehicle for this. The exchange will be richer if you come forward to share your experiences big and small. We look forward to your suggestions for improving the Journal and to your contributions.

Country Focus



Mr R Chandramouli, the Indian Assistant Comptroller & Auditor General Commercial, writes about the use of Information Technology in the Supreme Audit Institution of India

Background

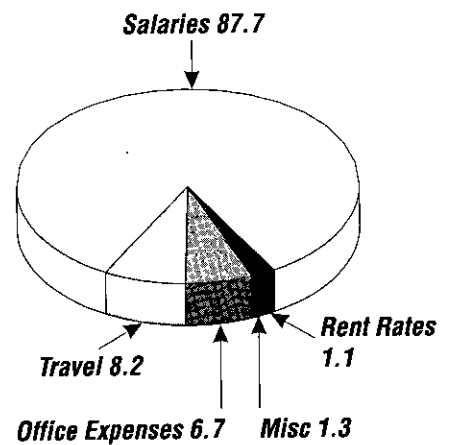
India is a Union of 26 States. The Comptroller and Auditor General of India (CAG) is the Supreme Audit Authority, common to both the Union and the States. As the most important instrument of accountability, the CAG has a combination of accounting and auditing functions. He is responsible for the compilation of the accounts of the States and auditing the accounts of both the Union and the States as well as a large number of bodies and authorities owned, controlled or financed by governments. He ensures uniformity of accounting and auditing standards for the Union and State governments. He also plays a fiduciary role in Union-State financial relations.

The CAG is the head of the Indian Audit & Accounts Department (IA&AD) which comprises 105 offices, 26 of these offices deal with accounting, 68 with audit, 10 with training and one is the Headquarters Office at the apex. The CAG generally has two separate representatives, called Accountants General, for Accounting & Entitlement and Audit function in each State.

IA&AD employs 59,875 persons as detailed below:

The executive management cadre, called the Indian Audit & Accounts Service is common to both accounting and auditing.

The audit operations of the IA&AD span the geographical length and breadth of a fairly vast country. However, except for auditors of Union Government Departments and commercial undertakings including companies for which major shareholding is with the government, auditors generally tend to be confined to their respective States. Functional specialisations include revenue, commercial, railway, posts and telegraphs, defence and the others (called civil). The expenditure audited by IA&AD is approximately US \$227 billion per annum. IA&AD's budget of US \$105 million is expended as follows:



<i>Audit Supervisors</i>	11,506	<i>Accounts Supervisors</i>	2,974
<i>Auditors</i>	15,911	<i>Accountants</i>	14,198
<i>Clerical Staff</i>	2,854	<i>Clerical Staff</i>	4,784
<i>Staff Services</i>	4,763	<i>Staff Services</i>	2,885
TOTAL	35,034	TOTAL	24,841

The IT Strategy

The Computer Policy

IA&AD first used computers in the 1960s as soon as some auditees started using them. For nearly a decade thereafter, attention to computers waned as other pressing accounting and structural adjustments took precedence due to major changes in the accounting set-up. Computerization started seriously again in the mid-1980s, initially with the assistance of external consultants and with in-house expertise a few years later. After acquiring a little experience over a couple of years, a "Computer Policy" paper was widely circulated in 1987 for comments and as a broad indication of the Department's policy. In 1989, a formal "Computer Policy" was put out, setting out the objectives of the policy, a broad strategy and, most importantly, an assurance that computerization would not result in retrenchment of staff.

Centralised Direction and Control

While approving the policy, the CAG also set up an EDP Steering Committee comprising very senior officers representing different interests within the Department and empowered to deal with all matters relating to the use of IT in the Department. The Committee was charged with the responsibility to direct and oversee the IT function as a whole, and was specifically mandated to acquaint itself with the progress made by SAIs of developed countries in computerised accounting and audit.

The IT Strategy

The Steering Committee took the following initial steps:

- a) Standardised hardware (DOS-based IBM-compatible PCs).
- b) Standardised major software packages (Lotus 123, dBase IV and MS-Word 5).
- c) Centralised the IT Budget and procurement of hardware and software.
- d) Formulated a Training Strategy and detailed training plans.

These steps were intended to facilitate optimum utilisation of IT-skilled manpower resources and funds. Competitive prices were obtained through tenders and bulk purchases while simultaneously ensuring that after-sales support and maintenance would be

available in all cities for which procurements were being made. This also obviated the need for procurement capability in all offices. The standardisation of software enabled formulation of detailed training plans.

The IT Strategy focussed initially on word-processing for the following reasons:

- a) Successful results could be demonstrated quickly and widely which:
 - i) helped to assure management about our ability to harness IT, and
 - ii) enabled staff to see the beneficial impact of computers.
- b) It re-inforced the assurance in the Computer Policy that introduction of computers would not necessarily involve retrenchment of staff and partially allayed fears that jobs would be lost.
- c) It introduced a computer culture in offices and associated disciplines like virus control, daily back-ups, etc. before more serious data-processing applications were taken up.
- d) It provided lead time for software developments for various applications.

Training

The computer Policy expressly recognised the importance of training for building and sustaining IT-skills. In view of a large workforce and relatively very poor base of IT-skills, the EDP Steering Committee formulated a training strategy based on a needs-analysis. This strategy had the following fundamental principles:

- a) In-house training would be cost-effective for large-volume and long-duration training courses.
- b) For maximising learning, all skill-oriented training courses should have 1 PC per trainee and the practical (computer lab) sessions must include lab assistants on a ratio of 1 for a maximum of 4 trainees.
- c) All training courses should be customised for the Department and standardised; they should be delivered through trained trainers.
- d) To optimise resources, skill-building would be in phases: initially, a small group in each office would gain a

reasonable standard of skills on each of the standard software packages and, in subsequent rounds, advanced or specialised courses would be made available.

- e) The executive management cadre should be compulsorily trained on computers; new entrants could be trained during induction training and the others could be covered in a phased manner.

To implement the training plan, five of our nine training institutes were upgraded for computer training with 14 PCs each, computer-projection equipment, lab assistants, computer faculty, library of computer books, programmed learning (tutorial) software and standard training course-ware which included course-outline, objectives, exercises, instructor's guide, etc. The infra-structure for round-the-year training created in these five institutes has been serving us very well and the Department can now boast of a wide base of IT-skills scattered through most of its offices. 837 supervisory staff and 1038 support staff members were trained through our training institutes; field offices have also trained many of their staff in-house.

Hardware

The announcement of the Computer Policy was followed by a rapid expansion of computerisation in terms of number of PCs employed and types of applications covered. The annual procurement of hardware is shown in the chart below:

Computers used have been growing in sophistication from the PC-XT to the 286s, 386s and the 486s. A predominant DOS environment is being gradually converted to a Novell-Netware-based LAN environment since 1993; a few UNIX-based systems which were in use before standardisation continue to be used under

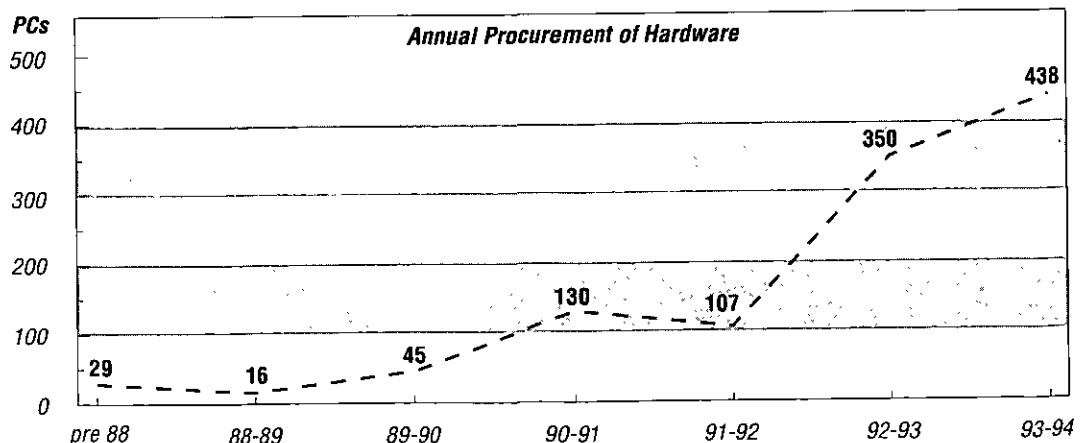
UNIX. The gradual migration from stand-alone PCs to LANs in our opinion, enables technology absorption and prepares the offices for proper LAN administration. Applications have also been moving in tandem from individualised word-processing to shared data base management and processing.

With field offices gaining IT experience, the procurement of hardware is being gradually decentralised with the Steering Committee still laying down the standard configurations.

Software

Standard Software: Besides the three standard DOS-based software products viz. Lotus 123, dBase IV and MS-Word 5, a number of other software packages are also used: (i) Pagemaker for desk top publishing, (ii) Freelance Graphics for Windows and IBM Storyboard plus for presentations, and (iii) Harvard Graphics, Graphwriter-II and Freelance Graphics for graphs. Several Windows-based software packages are also used though not formally standardised: 123 for Windows, Word for Windows, Lotus Improve, Microsoft Project and Microsoft Access. On LANs, cc-Mail has been standardised as the e-mail software. Software procurement is still regulated centrally even though hardware procurement is being gradually de-centralised; this is to prevent proliferation of packages for which training and support cannot be sustained.

Application Software: Application software is usually developed only in dBase IV or Foxpro. All important application software is subject to a two-stage review by the Steering Committee: (i) at design stage to assess the cost effectiveness, feasibility and theoretical soundness, and (ii) before implementation, to assess controls, documentation, test results, etc.



Software Development: Application software is mostly developed in-house and concentrated in a few offices only. Persons showing aptitude have been trained in systems analysis and design and programming and formed into software development teams. Their sound knowledge of the functions being computerised reduces greatly the risk of producing systems that do not meet user-needs or address basic problems. The review by the Steering Committee, which has access to sound technical advice, is intended to ensure acceptable standards of design and programming. The preference for in-house software development is a conscious decision that has been paying off.

Audit Software: Auto-Import, IDEA and ACL for Windows are used. IDEA has been more widely used as ACL for Windows was acquired only recently.

Organizational Structure

The IT strategy, standards, budget, short-term periodic plans and monitoring of implementation are handled by an EDP wing in Headquarters, headed by a Director (EDP & MIS) from the executive management cadre. He reports to the Chairman of the EDP Steering Committee. Director (EDP & MIS) is assisted by a small team of technical and administrative staff to discharge his administrative and technical responsibilities.

The field offices generally have "EDP Cells" comprising a few computer-skilled persons; their size tends to vary according to the volume of transactions and the complexity of the EDP systems being used. Separate IT departments will be necessary only in offices where machine and other resources have to be shared by more than one user department; this situation may be arising shortly in several offices.

How IT is used

Accounts Offices - Accounting and related services

IT is widely used for accounting functions as their qualitative improvement through computerization is one of the main objectives of the Computer Policy. Applications in accounting and related services include the following:

a) Compiling the accounts (financial statements of State Governments from primary documents, ie vouchers, or from an intermediate level).

- b) Maintaining employee-wise, centralised accounts of social security deductions (provident fund deductions) of State Government employees whose payroll is drawn and disbursed by a large number of State Government functionaries located in numerous places.
- c) Authorising retirement benefits of State Government employees.
- d) Some applications dealing with intermediate accounting processes where the compilation of accounts itself is not computerised.

While (a) & (b) are run on LANs, (c) & (d) are run on stand-alone PCs or LANs depending on volume and availability of LAN.

Audit Offices - auditing

The main application software for auditing deals with audit planning and audit follow-up. The software has been designed in a modular fashion to permit addition of modules as and when data bases are built up. This standard software for all audit offices is in various stages of implementation in different offices; the initial data conversion relating to all auditees, running into several thousands in each office, and all unsettled audit observations is a major and time consuming exercise.

Word-processing, desk-top publishing, graphs and graphics are used widely for producing audit reports for camera-ready offset printing in multiple languages.

Common to Accounts and Audit Offices:

The following applications common to all offices are also computerised:

- a) Personnel Management.
- b) Budget.

In the Headquarters office, a number of applications are computerised:

- a) Management Information System.
- b) Examinations results processing.
- c) Recommending chartered accountants for public sector companies.
- d) Library information.

Importance of IT to the Department

The Department considers computerization to be a necessity for improving the efficiency of its accounting functions and for improving customer servicing relating to provident fund accounting and authorisation of retirement dues like pension. As the Department acquires the ability to manipulate large volumes of accounting data quickly, it can provide better management accounting services to State Governments.

In audit offices, computerization is expected to facilitate follow-up action on management letters to auditees. As data bases of audit observations are being built electronically auditee- and subject-wise, in course of time, these are expected to provide valuable inputs to the audit planning process also.

The Department also expects to benefit greatly from the use of audit software for downloading data from mainframe and other computers, extracting and analysing data and applying statistical sampling in audit.

Computer Auditing

The Department is keen to upgrade its capabilities for auditing computer-based systems pari passu with the quickening of the pace and sophistication of computerization among auditees. This interest is reflected in a special project that has been taken up to acquire this capability rapidly and sustain it.

After a detailed survey of auditees' systems and applications, a computer audit strategy was formulated. This strategy was based on the assessment of the probable impact of auditees' computerization on audit methodologies. After identifying the skill-base needed to properly discharge the CAG's mandate in such areas, a plan was formulated for created the skills. As part of this plan, 3-member computer audit groups have been set up full-time in 32 of the 68 audit offices in two years. These groups are given specialised, 5-spell 20-week training sandwiched by on-the-job-training. Besides, a few pilot teams possessing comparatively high-level IT skills are

carrying out special audits and translating the experience into training course material.

Future Strategy

A major factor in the Department's IT Strategy is the support of the staff to the computer policy. Fears about displacement and retrenchment caused by automation, have to be addressed and allayed. Applications have to be selected carefully, having regard to the assurance in the policy that staff will not be adversely affected. Action plans are formulated periodically (once every two years) and the staff are sought to be convinced about their utility. This is a time-consuming but inevitable process. So, technology is harnessed selectively.

Most of the software needed has been developed. While newer areas are being explored, largely in accounting, the emphasis currently is to replicate, in a number of offices, the applications which have already been developed. The training infrastructure is also being strengthened to increase the pace of skill-building.

Two major areas are likely to be the focal points for development in the near future; text-retrieval systems and WANs. Preliminary work in both areas is in progress already. The present system of floppy-based transfer of MIS data from field offices to headquarters will be gradually replaced by modem-based or other network-based communications.

Other areas being explored are new audit software like Centrelink for downloading from ICL-mainframes and CRAMM for Information Systems Security Reviews.

Conclusion

We are moving forward the way we would like to: with the support of the staff who have to run the systems and at a pace at which we can assimilate the changes and sustain them. We are also conscious of the importance of remaining in sync with the nature and pace of computerization among our auditees.

The use of IDEA at the Swedish National Audit Office

Many SAIs use IDEA - a popular file interrogation software package. Nándor Hargitai and Ann Härelind detail its use in the Swedish Audit Office.



The Swedish National Audit Office (RRV) is the central state agency for accounting and auditing in the Swedish government administration. The RRV reports to the government and/or the agencies concerned. Its primary task is to promote effectiveness and efficiency in government administration.

IDEA at the Swedish National Audit Office

The Financial Audit Department at RRV has used IDEA since 1988. We have acquired a national licence for IDEA. This means that the number of users can be unlimited. All those wishing to have access to the application can have it installed in their PC. The version we use today is IDEA 4.1.

IDEA is also used on portable PCs for file analysis at the offices of clients. The client's bookkeeping records are loaded from the auditor's own PC, or from a server on our network, onto the portable PC. The advantage of this facility is that, when the auditor is visiting the client, he can quickly obtain information about different situations of which he was unaware when planning the audit. The audit might show, for example, that a payment has been made to a person or company that was not entitled to the payment. A check can then easily be made in IDEA if any other payments have been made incorrectly to the recipient in question.

Many of our auditors are also engaged in programmes of international cooperation and training in Central Europe and Africa. In these programmes they have often had the opportunity to show how we use IDEA in the auditing process.

The IT environment

All auditors have their own PC which is linked to a local area network in a client/server environment. All have the capability to work under Windows. At present we only have access to the DOS version of IDEA. However this can be installed and run under Windows, and the mouse can be used instead of the function keys.

Among the most important general applications software we use at present are Excel 4.0 and WordPerfect 5.1 for Windows. Even though IDEA is a popular and much used auditing tool, there is other software which can be used for file analysis, for example ACL and dBase.

Every year some 400 ministries, agencies and other organizations are audited. The majority of these organizations, some 80 per cent, are linked to a central accounting system which is run on an IBM mainframe computer. We have access to the accounting system and its databases via our local area network. Two of the system's databases are used - the transactions register and the payments register.

With the aid of a search routine specially developed for auditing purposes, the relevant databases can be read. The routine is available on-line. The result of every search is a file in ASCII format. After the file has been produced, the auditor can check the result partly by looking at the log file and partly by looking at the data file.

The next step is for the auditor to transfer the raw data to his own PC or to a server on the network. This step is performed by a program which is resident on a network server. The transfer process can take from

several minutes to several hours depending on the size of the file which can vary between a few hundred Kb to 30-40 Mb. Each record is 315 bytes and consists of 38 fields.

IDEA in auditing work

IDEA is used, for example, for substantive auditing and for preparations prior to a visit to a client. To be able to do this work the auditor must have access to registers which are stored in the central accounting system. Data from these registers are obtained by using the methods described above.

We need to convert our ASCII files, which have variable record length, to a file with fixed record length. For this purpose we use IDEA's own CHKRECL. To facilitate this frequently recurring step we have made a BAT file which executes CHKRECL. We only need to give the names of the input and output files. Predefined records which follow the record specification of the original files are used. Each auditor can also define his own records.

Before the analysis of the registers begins, a directory is created in IDEA for the subject of the audit. For this purpose so-called Agency (Client) Directories are used. In this way the auditor orders the files he has created in well structured directories. IDEA can then be run directly against the unit in the organization which the auditor wishes to examine.

IDEA is resident on the user's PC. However this does not prevent the auditor working with a file which is on a network server since the client/server facilities can be used, ie we can link a file into the program even if it is not on the local area network.

After the conversion of the files has been completed and the directory has been created and selected, the link to IDEA can be made.

Some of the most important fields we work with are: the five different account fields - accounting date, voucher number, amount, transaction code, and the recipient of the payment and his postal giro account number.

Preparatory auditing

Creating a general ledger

The first step in the processing work is to check that the data which has been transferred is correct. This is done by creating a general ledger with the aid of the function Key Field Summarization. The result is a file which shows the total amount

and the number of transactions for each index field.

If, for example, we want a total for every account, we go into the general ledger account and add the amount field. The results file will then consist of a total (balance) for each account and information on the number of transactions in each account. The file which is created corresponds to the agency's general ledger and can therefore be compared with this ledger.

Creating totals for departments, sections, etc

Materiality and risk are key concepts in auditing. In order to take materiality into account in the planning work, the material is processed with the aid of a totalling function. We total files by departments, sections, functions etc. The files are indexed at the organisational level, for example files connected to a specific section in the organization, and are then totalled by amount.

The result obtained is a file in which the number of transactions and the total balance obtained relates to a specific organization or part of an organization. In this way, in combination with the risk analysis the auditor has prepared, those parts of the organization which handle large numbers of transactions or large amounts are found. The audit can then concentrate on relevant areas from the point of view of materiality and risk.

Substantive auditing

Selection

At this point we know the areas which are relevant from the point of view of materiality and risk and should therefore be audited. To analyse the material further, interesting areas are selected from the original files with the aid of Extraction Functions. These areas can be whole departments, sections, functions, sectors etc. They can also be certain balance sheet items or profit and loss account items (types of revenues or costs).

If an audit needs to be undertaken of a certain type of action, a selection of transactions of that type is made. It can also be of interest to audit a certain type of transaction, for example payments received, payments made, or transfers.

Selection of amounts

The selection of material for an audit must be realistic. If the data selected is too extensive, further limitations must be

applied, for example transactions which exceed a certain amount.

The monetary limit chosen depends on the size of the material, the client's turnover, the period of time the auditor has at his disposal and so on. Sometimes we proceed by trial and error until a suitable limit has been reached.

It is important that the selection made is representative of the material as a whole. In order to find out the monetary limit to choose in order to cover a certain proportion of the material, we stratify on the amount field, by using the function "Stratify".

Virtual fields

To check deducted value added tax, for example, we use virtual fields. First all transactions which contain value added tax are selected, and then all transactions on a cost basis. The files are matched and a calculation is made of value added tax deducted in relation to the total invoiced amount. The result is a virtual field which contains the percentage deducted.

IDEA and reporting to Excel

One great advantage with IDEA is that it is easy to export to other tools. One tool which is often used is Excel. IDEA together with Excel is used, for example, in analytical audit work.

The auditor may wish, for example, to compare different periods (months, years)

of a single client or to compare similar clients or organizations in the same group. Then the processing, selecting, indexing, sorting etc is done in IDEA. When the basic material has been prepared, the files are exported to Excel. In Excel, for example, key ratios can be calculated. Furthermore different values, periods, or agencies in the audit can be compared with each other.

Another example is that output files are exported from IDEA to Excel in order to produce more attractive audit programs. Predefined macros in Excel add a field for comments to the IDEA data. Columns for audit stages, reference numbers for annual files etc can also be added.

Final remarks

The purpose of IDEA and other similar EDP based auditing tools is that they should improve our audit work in one respect or another, either through better quality or improved efficiency. In the RRV, IDEA and other audit tools are used for both these purposes.

A concrete example of savings which can be gained by efficiency in the substantive auditing work is that by collecting data from the payments register the auditor can quickly find out whether taxes etc are paid at certain points in time. Using this method the auditor is spared having to examine invoices, which can be very time consuming.



Nándor Hargitai

Nándor Hargitai has been working at the Swedish National Audit Bureau since 1990. His main responsibilities involve giving IT and EDP support to the approximately 140 auditors and other staff members of the department. He is also involved with developing auditing techniques for both mainframe and PC environments.



Ann Härelind

Ann Härelind has worked as an auditor at the Swedish National Audit Bureau since 1988. She has used IDEA extensively in her work. She has also been involved in teaching the use of IDEA both at the RRV, and abroad as part of the Bureau's international training programme.

Text Retrieval at the UK National Audit Office



Auditors require quick and easy access to an increasingly complex range of information. Mandy Dolphin highlights the text retrieval initiatives in the UK Audit Office.

Mandy Dolphin



Mandy Dolphin joined the NAO in 1988. She now manages a busy Library providing a wide range of information-related IT systems such as the Central Reference Database, Bulletin Board and Library Automation.

Background

The UK National Audit Office (NAO) is responsible for providing independent assurance, information and advice to Parliament. This covers the proper accounting for Central Government expenditure, revenue and assets and the economy, efficiency and effectiveness of the use of resources by Government departments.

The NAO employs 780 staff. The majority are based in the London headquarters in Victoria. The remainder are based in a number of locations around the United Kingdom and in Rome and Geneva.

Three quarters of the NAO staff are professionally qualified accountants or under training. The remainder provide administrative and specialised support such as information and computer services. The NAO also engages consultants and other staff on short term contracts where specialist knowledge and skills are required.

Why the NAO considered Text Retrieval

As with other audit and accountancy institutions the NAO makes use of a growing body of professional guidance and precedent. Searching and identifying items can be time consuming if carried out manually and expensive in terms of staff time. More often than not the information is needed immediately for it to be of any benefit. The NAO also wanted to make savings on the number of publications issued to the office. With the development of a Text Retrieval system it was envisaged that fewer publications would need to be

issued on a one per section basis saving costs.

Text Retrieval was one of a number of strategic systems identified in an Information Technology (IT) strategy carried out in 1987. Prior to this the NAO had purchased a variety of computer equipment and developed a number of stand-alone systems. These ranged from PCs used by secretaries for wordprocessing to specialist time recording and personnel systems.

The Text Retrieval package selected was BRS/Search which offers information management at the personal, department and corporate level. The key reasons for selecting BRS/Search were that it has a low storage overhead; is easy to tailor; is feature rich; could easily be integrated with word processing software; and it has mini and micro computer versions.

The IT Strategy identified two main types of internal reference databases;

- Common or Central databases which were relevant to all staff; and
- Unit or specialist databases, relevant to small groups of staff.

We developed the central databases first and introduced our Central Reference Database (CRD) in November 1989.

We currently have twenty central databases operational. Some of these are security restricted databases, eg for Directors and Management Board. The rest contain reference material such as copies of our reports to Parliament, our audit manual and guidance and internal management circulars. These are available to the 721 staff who have access to the NAO's Office Automation computer system.

Central Reference Database: Available Databases

CN00 PAC Reports 1969 - 1983
CN01 NAO Reports, PAC Reports and Treasury Minutes
CA01 CN00 and CN01 combined
CN02 Finance Manual
CN03 Audit (including Audit Manual and Auditing Standards)
CN04 Index to Select Committee Reports
CN05 Accounting (including Accounting Standards)
CN06 Strategic Plans: Study Proposals
CN07 Personnel
CN08 Management Circulars
CN09 Travel
CN10 Office Services Guide
CN11 Audit Precedent
DC01 Directors Circulars
MB01 Management Board Minutes
MB02 Management Board Papers
MB03 MB01 and MB02 combined
UA01 Audit Advice
UA02 CN11 and UA01 combined
UA03 National Audit Office Act
UA04 Policy Unit Indexes and Abstracts
UA05 UA03 and UA04 combined
UA06 Policy Unit Enquiry Forms
UE01 Defence Working Papers

In 1991 we began developing Unit databases and we now have a total of eight. One contains the full text of enquiry forms used to record audit advice given by our technical section; it can be searched each time a new enquiry occurs to ensure consistent advice. A similar database is now in operation for Policy Unit enquiries.

One advantage of the BRS/Search retrieval software has been the ability to concatenate databases, that is to allow searching of more than one database at a time. We currently provide this facility in three areas and plan to expand its use over the next year.

Making Searching Easier

In 1989 when we first introduced CRD, we used a BRS interface known as SearchMate. This interface was customised to integrate with Uniplex, our Office Automation software, in three ways; to save a retrieved document into a Uniplex Word Processing file; to Print using Uniplex utilities; and to access other Uniplex functions such as electronic mail while retaining the search session in BRS.

Whilst the SearchMate interface was well used by staff accessing the databases frequently, the occasional user found it

frustrating and difficult to remember the necessary steps needed to retrieve relevant information.

In 1993 we therefore introduced an alternative interface, developed by Simdell Ltd. This new front-end is based on Uniplex. Searching is carried out by filling in a Uniplex form and all commands are executed by using function keys. Where possible these function keys replicate the function keys of the Uniplex package to provide consistency.

The introduction of the new interface has proved successful. Occasional users feel more comfortable with an interface which has the "look and feel" of the Word Processing package with which they are familiar. Access statistics indicate that the new interface has increased usage of CRD by some 30%. The more "expert" users do however continue to use the original SearchMate interface.

Taking Text Retrieval further

The extent to which data should be computerised depends upon the retrieval requirements and the "importance" of the information. We began with full text retrieval; because the main central

reference documents are of a permanent nature, requiring limited amendment and provide information which needs to be available to a large number of people.

The second phase, which has now started, tackles the problem of providing effective, yet efficient retrieval of a wide range of important information which is constantly being added to and is of a semi-permanent nature.

Without some structured method of retrieving references to files or the information contained within them it is likely that either the information will be lost or it will be retrieved too late.

We identified four ways of handling this material, and we have developed a cascade approach to its retrieval:

- **File level** - the database contains a list of file titles and reference numbers only
- **Index level** - the database contains the file titles and an index to all the papers held within each file
- **Abstracts and Keywords** - the database contains an abstract and assigned keywords to indicate the subject content of files
- **The Full Text** - the database contains the full text of all files.

The Pilot Study

In order to test this approach and give a clear understanding of the issues, problems and costs involved we decided to conduct a pilot project in our Policy Unit.

From the outset we recognised that significant resources would be required to assign abstracts and keywords and to reproduce full text of files; this made it likely that when the facility was offered more widely users would chose to start with file level and index level retrieval. In the longer term however, upgrading to abstract, keyword and full text was probable for files of corporate interest.

Computerising a mess can only result in a worse mess. We therefore undertook a careful review of our hard copy files before we computerised them. This involved checking for duplication, providing the files with meaningful titles, and weeding old material.

With full text retrieval an index is produced by the retrieval software. However as we were dealing with files and index sheets rather than full text, the first step was to produce an index for the Policy Unit area.

Constructing a good index is the key to effective information retrieval although it frequently gets little attention as it is laborious and time consuming. Once the index was produced it was used to construct a classification scheme. The scheme is based upon the Dewey Decimal Classification scheme and is used to assign file numbers for location purposes; the numbers also reflect the subject content of the files.

Pilot Databases

For the pilot study we developed a file tracking system and three databases, an index, abstract and keyword and full text levels, we also offered a concatenated database covering all three.

For retrieval at **file level** we have developed a file tracking system using the Uniplex Office Automation Package. This enables retrieval by title or classification number and also provides a file history to establish who currently holds a file and who has seen it previously. Using this system it is also possible to produce an up to date file register in hard copy.

The **index level database** provides references to the NAO's audit precedent files. Each file is a separate document with a title and reference number together with an index to all the enclosures held in that particular file.

The **abstract level database** covers central policy and is an extension to the index database. For each enclosure on a file a mini abstract is provided. Each file and thus each document within the database also has a subject classification number which can be searched, and which also acts as the file location point when retrieving the hard copy.

The **full text database** provides access to material related to the NAO Act, such as the first draft of the Bill, Adjournment debates and relevant Select Committee Reports.

Within each document we have embedded cross references which link documents within the database. This approach is a fore-runner to the development of hypertext searching which we hope to introduce during 1994. Hypertext enables the user to highlight an embedded reference and view the relevant document immediately rather than having to search for it.

Use of External Text Retrieval

Text Retrieval is more than just an in-house tool. There are several thousand

commercially produced reference databases which can be accessed for a fee. Our auditors need access to wide ranging and vast amounts of information relating mainly to value for money investigations. These can range from developments in the financial control of the National Health Service; to texts on coastal protection; to material on Urban Development Corporations; to the Management of military clothing.

Accessing this information manually, using indexes or abstracts is slow and time consuming, if you can get access to the material. But using external databases is a highly effective way of providing a wide range of relevant material at relatively low cost.

In the NAO we make use of eight major hosts - the largest, Dialog, offers over 500 databases. There is an overlap between many of these hosts, so searching can be complicated.

We also make use of databases available on CD-ROM. This can save costs because there is no on-line connect charge. However updating will often be done only monthly or quarterly compared to daily or weekly with on-line systems.

Each of these databases has different searching characteristics, and searching can be quite sophisticated. The complexities and access costs have led us to regard use of external databases as a job for information professionals.

We undertake many small searches on an ad hoc basis. In 1990 we launched a Research Service embracing both internal and external sources of information to provide a comprehensive pack of information to VFM Research teams embarking on new studies. The Research Service has proved extremely valuable particularly in saving audit teams time and in providing the most up to date information available.

A New Medium

Over the past three years there has been a growing interest by other UK Government departments and SAI's in gaining electronic access to the NAO's reports. In 1993 we therefore began to examine the possibilities of providing our reports in CD-ROM format.

We approached BRS Software Products (now BRS Dataware) to produce the CD-ROM for us. Because we were already using BRS Software on our central Unix system there were minimal problems in

providing our data for inclusion in a CD-ROM.

BRS designed an interface for us based on their Epi-Find software which is used in 95% of BRS's CD-ROM production. The interface was tailored to incorporate the search fields we required for retrieving relevant reports.

The CD-ROM contains a suite of databases providing access to NAO Reports, PAC, PAC Reports and Treasury Minutes from 1969 onwards. The CD-ROM is self-contained with full loading instructions in an accompanying booklet, and full on-line help once the CD-ROM is installed.

A copy of the CD-ROM was recently distributed to each English-speaking SAI. The CD-ROM will be updated on a six monthly basis. If your SAI has not received a copy and would like one, please contact the UK NAO Information Centre Help Desk on + 44- (0)171-798 7264.

Now that we have embarked on producing our own data in CD-ROM format we plan to investigate other types of information suitable for this medium. We could, for example, provide our audit teams on local audit with CD-ROMs containing our Audit Manual. Auditors would then be able to access a large volume of data when they are with clients, without having the security problems associated with dialling into a central system.

Moving Towards Document Management

The NAO generates a vast amount of information in paper and magnetic form and we also have a large archive. But to be honest our archive management is poor, and reviewing/weeding old files is the last job on anyone's list.

But our IT strategy, particularly the text production and filing parts of UNIPLEX, and BRS Search offer the start of a total document management system. And the introduction of document image processing (DIP) systems - although not yet fully cost-effective - are likely in future to enhance our records management.

So we are investigating options for scanning text, image and graphics and making them accessible to end users with database software and a high resolution monitor. Information can be stored on optical discs held in a "jukebox" and terminals can be networked. Links could also be set up with information held on CD-ROM and microfiche to provide a total document management system.

The OAG Audit Briefcase



John Adshead and Eric Anttila look at moves to empower the individual auditor and the audit team in the Canadian Audit Office

John Adshead

John Adshead joined the OAG in 1983 with a 10 year background in EDP auditing with Coopers & Lybrand. He is now Principal of the Informatics Audit and Consulting Team at the OAG. His team provide consulting expertise on the use of IT in audit, and research and develop new audit tools and methodologies.

Eric Anttila

Eric Anttila is Principal of the Information Systems and Technology Team at the OAG. With a technology background in both the public and private sector, he managed the development of the "electronic audit briefcase". His team research and develop new IT systems for the Office.

Background

Over the last 18 years, computer auditing in the Office of the Auditor General of Canada (OAG) has changed direction and evolved dramatically. Influences on computer auditing have included: strong senior management interest and support; pressure to reduce cost; comprehensive auditing experience; and the explosion of technological opportunities, in particular the introduction of personal computers.

The OAG bought its first personal computer (PC) about fifteen years ago and began seriously investing in them about twelve years ago. The first machines were of course desktop units. The Office recognised early on that the real audit work was done at the job site. As soon as portable personal computers became available some ten years ago, the Office started buying them, starting with "lugables" that weighed well over twenty five pounds. Our more recent purchases are lightweight, 486 colour portables, with large hard drives and fast modems.

Our initial strategy was to "empower the individual" by providing flexible and easy to use "tools" which would both support the auditor in the current audit process and provide the necessary flexibility to adapt to a changing auditing environment: tools which helped auditors to do more efficiently and effectively whatever they, in their individual professional judgements, thought appropriate.

In this initial phase, the most significant tools which the Office provided to its professional staff were personal productivity enhancers: those for word processing and for constructing spreadsheets. The tools provided were, for the most part, generic off-the-shelf tools.

In some cases, there can be advantages to be gained by providing in-house applications which will automate existing audit process. However, any custom development of this type will require annual maintenance, contingency

planning and extensive testing. This is a very expensive option for a small organisation. Our preferred approach is to use off-the-shelf software and customize only where absolute necessary.

A good word processor is equally appropriate for writing a great novel or for writing a great audit report. The impact of having a good word processing program is that it facilitates the creation and revision of large complex documents, and thus assists the writer to create better interview notes, memos, audit programs and audit reports. Senior auditors who were not initially expecting microcomputers to affect them have noted dramatic benefits. They have found that they can achieve savings by composing reports and memos on computers themselves. Documents can be "turned around" in hours rather than days or weeks. A grammar checker can assist the auditor with editing reports for more effective communication. The time saved can be re-invested in re-engineering the audit process, where the cost savings are even more dramatic.

Similarly, a good general purpose spreadsheet program facilitates better schedules, simplifies calculation and analysis and can produce graphs, thus replacing columnar paper documents. As a word of warning, because the user of such software rarely has knowledge of data processing control techniques, the spreadsheets that are created often do not contain adequate controls. Serious exposure to flawed or erroneous logic can result if the spreadsheets is used for management decision, input into other systems or used as the basis of financial statements.

The Office also provided a commercially available flowchart package for preparing flowcharts, diagrams, forms and organisation charts, and a graphics package for developing and presenting slides shows or processing graphics.

By the late 1980's the focus on empowering the individual was already being expanded

to include empowering the team by the inclusion of a generic communications program. Like other generic software, a good general purpose communications program facilitates communication but does not prejudice what should be communicated. It has a major impact on the communications across the various time zones to our regional offices, and the increase in communications enables ease of review and revisions in small quantities of text.

One notable accomplishment was providing all professional and support staff with personal microcomputers. The extensive use of electronic document preparation and review had enhanced our ability to perform audits. A focus on putting as much power into the hands of the auditor as possible has also been adopted by the Government Accounting Office in the USA and other audit institutions. This focus on supporting individuals has helped to both automate basic audit tasks and produce better paper documents. However, we began to recognise that important gains in productivity and effectiveness could also be gained at the team level by facilitating communications and information sharing.

Current Directions: Focus On The Team and The Group

Facilitating individual creativity in a team environment requires us to look at communications and applications that bring teams and groups together to share information and approaches. Evolving towards such an office information system facilitates the creation, analysis, sharing and communication of information within a group environment.

In the mid-eighties machine readable copies of methodology and reports existed but as there were not being referred to, word processing people tended to reuse the disks after a while. The Office realised that if we were to achieve more paperless and more productive use of tools those electronic copies of reports and manuals should be saved and collected together, to be made searchable electronically. To that end the Office acquired tools to permit the creation of a collection building tool and a collection searching interface. We also decided it was imperative that the auditor be able to easily store and retrieve this information in a shared information system. This ability to contribute electronic information in a shared information environment is critical to ensure the retention of our electronic "corporate memory".

Time and cost savings are possible if all members of the audit team have access to the most up-to-date team, group and client information. Review activities can occur in parallel and continuously, enabling better quality control to the audit itself. Supervision is thus enhanced and auditor training facilitated. In our interviews and surveys, teams who have shared electronic files throughout the audit, report improved quality and more effective audit management. Networking facilitates document exchange, management of the reporting and review edit cycle, and securing the team working paper files.

The Office began investing in an infrastructure for networking personal computers in the late eighties. Following pilot studies the Office was fully networked with 802.3 ethernet using existing unused telephone wires. A Unix based central computer was purchased and administrative functions were automated using Oracle tools and database management system. Corporate applications have been implemented on the central computers including a complete library automation package, a personnel system, extensive full text libraries, a system which facilitates the attest audit of the governments' financial statements, and a bulletin board system which facilitates exchange and dissemination of files and software.

Our electronic mail package is now in the process of being converted to an in-house network service using commercially available software. In-house mail will allow us to take further advantage of our network.

Current Directions: Windows

Personal Computer users have been constrained by the limitations of Microsoft DOS in recent years. A new world of packages based on a Graphical User Interface or GUI is now available to our users. These graphical packages are easier to use, easier to learn and more powerful than character oriented DOS packages that we first used.

Migrating our PC software from DOS to Windows is probably the single most important direction we have taken towards our objective of making software more accessible to auditors.

Auditors are used to having many file folders active on their desk at any one time and are used to seeing material that combines text and graphics. Our electronic briefcase only permitted one or two files to be active at a time and provided display of text only. Having our applications work in a more familiar and natural way helps

auditors to work more productively and learn more quickly.

These applications using a GUI require a shift in the way a user interacts with the computer. The auditor needs to use cursor keys or a pointing device, such as a mouse or trackball, to indicate which file should be opened. At any time the auditor can set current work aside and view other files or documents and to move freely from one document to the next without losing his/her place in any of them. The auditor can have easy access to the team working files which may be on several machines in different locations. All applications have similar functions. Once the auditor has mastered one or two applications, learning a new package is much easier because they all have a common 'look and feel'.

We are converting all of our auditors and staff to Windows over the next two years or so. We will proceed team by team to install and train.

Current Direction: Tools

Our long-term goal is to eliminate paper. Rather than briefcases full of paper files we see the computer as the briefcase. More and more of our working papers are now in electronic format. From the preparation of the audit plan through to the briefing material used by the Auditor General, all phases of the audit process use information technology.

Planning: Audits are resourced in the context of the Office mission statement, the priorities memo and group plans. This budget planning process garners the people and resources needed to see the audit to completion. The planning module of our corporate administrative system is being enhanced to facilitate access to, and creation of key corporate, audit operations, group and team data. For example, planners need the ability to download and manipulate data entered online by audit groups in order to compare and summarize group budgets, plans and resources.

Auditors can now search through volumes of text for issues and concepts automatically using a search retrieval tool called OAG*TEXT. Phrases or words need only be keyed in and the list of occurrences are displayed, ready for browsing. If a key phrase or sentence is required it is highlighted and automatically copied into the auditors report.

Text collection development will focus on team specific collections, audit files, audit programs and references. In the past, the use of OAG*TEXT on individual microcomputers was practical for small

amounts of static data (eg the Annual Report, once written, never changes).

However, one of the advantages to providing textual data will be when we can provide access to large amounts of dynamic information (eg working papers of ongoing audits).

To assist auditors, the Office has created a tool called OAG*CAT which helps organise working papers into searchable collections.

Research: Some audit issues are global in nature such as trade or the environment. Auditing these important value for money issues requires the auditor to see and review work done by legislative auditors in other countries and jurisdictions. The auditor needs access to international databanks published on CD-ROM, or available through other electronic means by means of the auditor's personal computer. This gives the auditor the best chance to be able to utilise databases and electronic files and documents that are increasingly part of the business environment.

An initiative was started internationally by the OAG to get other countries, institutes and public institutions to consider producing material electronically in some standard way. In order to demonstrate the power of the concept, the Office undertook a project to gather together all the electronic material relevant to public sector auditing that could be obtained reasonably. In return for sending the OAG their material, contributing institutions received a copy of the data base on CD-ROM. Participating countries include Australia, France, Great Britain, New Zealand, Sweden and United States. The European Community is going to contribute as well as states and provinces in Australia and Canada. Combined with our text retrieval software OAG*TEXT, it allows us to access over 250,000 pages of text including our audit manuals, guides and the published reports from the contributing countries. Auditors use the database to explore what others have done; how they have approached and reported on various audit issues and subject areas relevant to public sector auditing work. Our results to date show that CD-ROM is very cost effective as a publishing medium for large collections of static documents. We have deployed CD-ROM players in our regional offices and to each audit group, so that our auditors can have access to data services coming out now and in the future.

Authorities: Audit teams can now establish a reference set of relevant authorities, reflecting continuity and consistency with work done in the past and incorporating OAG policies, guidelines and directives.

The auditor can now access a wide variety of textual databases from legislation to government policies and regulations, to OAG reference material. The text management, searching, downloading and manipulation facilities on the OAG central computers and on the audit team computers have been developed and enhanced to meet this need.

Knowledge of Entity Databases: Our auditors see auditees increasingly dependent on databases for key corporate and operations decision making. There are, in the Canadian Government today, some 500 major financial systems and over 100,000 microcomputers each capable of creating and maintaining important data. How do we give assurance that these databases and therefore the decisions made based on them are valid? The fact that these systems are to a large degree permitting decentralization further complicates the audit environment.

Auditors need access to these auditee and entity databases so that our data and text analysis tools can be employed effectively. The ability to download auditee and entity data needs to be provided.

As part of our audit briefcase, auditors are provided with IDEA to perform data analysis and extractions. This tool, designed for auditors, was first developed in the Office, then licensed to the Canadian Institute of Chartered Accounts to develop the software further for the commercial market. IDEA is a user-friendly microcomputer software package that allows users to extract, analyse, and sample data from a wide variety of computers. The Office is actively involved in developing a new Windows version of this product, due out shortly.

Execution: Once audit programs have been established and reviewed and are ready for execution, the team needs to assemble all of the material needed to perform the assigned tasks and begin gathering entity information for analysis, perform testing, document work, evaluate results and write conclusions. Appropriate audit forms have been provided electronically to assure complete audit files. Better audits and audit files are the outcome of automation. To properly secure the data, the auditor also needs facilities which will permit simple and quick back-up procedures.

A major step was taken towards the production of electronic working paper files with the development by the Office of a software package called AUDITPRO. In addition to keying in steps and objectives, an inventory of audit programs can be searched electronically. After the audit programs are ready for execution they may

be used directly in preparing the audit file. References to schedules in the spreadsheet package or to notes in our word processor may be attached to the steps. AUDITPRO then keeps track of this reference and provides access to it with a key stroke. User interviews have focused on requests to improve the review function such that multiple documents can be viewed and compared and linked to other applications in the electronic briefcase. These important user requests for improvements can only be done by providing AUDITPRO functionality in the Windows environment. Once Windows has been fully implemented in the Office we will be reviewing the possibility of developing or acquiring a similar product.

The Office is currently evaluating a product of one of the major accounting firms that facilitates a top down risk based audit, by helping to identify and document risks and to determine the amount of work required to obtain sufficient audit assurance for each audit assertion. It then assists the auditor in selecting the appropriate audit procedures that will provide the required audit assurance, thus reducing the risk of doing insufficient work in some areas, while reducing over auditing in other areas.

The auditor will continue to be provided with greater accessibility to the actual financial information of our clients. The migration of mainframe audit tools to increasingly more powerful microcomputers will continue. This migration will include the use of IDEA as an alternative to Mainframe tools. Where IDEA cannot meet the needs of a specific analysis project, emphasis will be placed on the acquisition or development of microcomputer based applications as opposed to mainframe applications, whenever this is possible.

It is recognised that there will continue to be situations where due to the volume or sensitivity of the data, it will be necessary to access information on client mainframes; therefore the Computer Audit Group will maintain expertise in the use of mainframe technology.

Reporting: Upon completion of the execution phase, review and reporting of results becomes the key activity. To facilitate team, group and other OAG review and reporting, the supervisor, manager, reviewer and editor need access to a much bigger screen so that two or more full document page images can be viewed simultaneously on the screen in their entirety. Techniques which facilitate attaching notes and audit marks are now being piloted. Interchange of review notes, status reports and chapter drafts demand that OAG communication facilities

continue to be improved. Increasingly the Word Processing and Document Publishing software applications are converging; however, there are publishing requirements that go beyond what WordPerfect offers so we are working with our Graphics group to utilise a publishing package that is compatible with our Office standard software.

The auditors now have very high speed modern communications for work outside the Office and network connectivity when inside. Effective presentations are a vital part of getting the OAG message across. The auditor needs the most effective tools that the commercial world can offer to make an impact with the client.

By focusing on the team and group we have helped eliminate paper and move towards an electronic world that drives the audit in an efficient top-down risk based manner.

Future

Our future lies in realising the personal computer's full potential as part of re-engineering the audit process to align it with the Office's corporate mission and vision.

The ultimate goal of the OAG is to de-emphasise paper as business in general does the same. We want to move in the direction of the online audit, but in the near term we must be practical and provide interim steps that permit traditional review methodologies. In other words a step by step plan to go paperless will be more effective than an outright jump into an all electronic world. At the same time our internal office guidance needs to be changed to reflect an acceptance of electronic audit working papers.

Artificial intelligence techniques need to be explored to help the auditor sift through massive amounts of reference material to find the most relevant items. Research into smarter and better tools for client information analysis will continue. Developments in artificial intelligence will continue to be monitored. We want to focus on new approaches to substantive testing and issues analysis.

To assist with recording of evidence, the auditor needs access to improved scanners or digital cameras, and central servers which can store large amounts of auditee files and image data for analysis or documentation.

Work has already begun with our parliamentary liaison group to find new and better ways to get our message to the legislators in Parliament and to the taxpayer. Audio-visual and multimedia tools are being explored and developed in order to facilitate getting the OAG message across to the public, the client and the media.

Our auditors face an enormous challenge. New analytical tools may be needed. Access to client networks, data repositories and utility programs will be needed for comprehensive auditing. Processing complexities will need to be understood when networks are interconnected between government departments as well as with suppliers. Auditors will need to have first hand knowledge of security, communications and data processing issues since departmental and program decision-making will increasingly be made on the basis of data pulled from electronic files. Increasing use of Electronic Data Interchange and other 'paperless' methodologies for doing commercial business represent a challenge to traditional audit trails.

Auditors must consider the re-engineering of evidence. The Office is now working on the first completely electronic audits, that is, audits where there is effectively no paper audit trail. They must contemplate the possibility, now in place on a national basis in Sweden, of direct access to all transactions in electronic form. The issue of sample design, which has challenged the profession for years, becomes an issue of test design when all transactions are electronically accessible. Methodologies must be re-examined to ascertain the extent to which they limit procedures in the future because of the limitation of technology in the past.

The need to re-engineer the audit process is key to harvesting the investment in the new wave of computing, and re-engineering the audit process will be required by the OAG in the future to fully take advantage of the new emerging technologies, especially in the fields of telecommunications and networking.

By carefully aligning our information technology strategy with our corporate mandate we will facilitate the achievement of the OAG's corporate mission through the use of technology. We continue to see PC's as being central to that strategy.

News from around the World

JAPAN

The Board of Audit of Japan published its Fiscal Year (FY) 1992 Annual Audit Report in December 1993. The Report included many findings formed by using computers.

The Board's EDP Division has installed a mid-range HITAC M-6 computer and processes data centrally for the 34 audit divisions. In 1993, the EDP Division processed data for 10 audit subjects using the central computer facilities. In addition, the audit divisions had a total of 336 micro computers installed as at January 1994. In 1993, they processed data using these micro computers for 24 audit subjects using software packages such as LOTUS 123, R:Base and dBase IV.

Examples of computer-assisted audit findings from the annual Audit Report are:

A. Processing of national hospital inpatients data files

In Japan, hospitals claim nursing care charges according to prescribed standards, such as the number of inpatients attended by one nurse and inpatients' average hospitalization period. The smaller the number of inpatients attended by one nurse, or the shorter the average hospitalization period is, the higher nursing care charges hospitals can claim. The Audit Board processed 4 million hospital inpatients' records to calculate their average hospitalization period by:

- 1) extracting specific information such as dates of admission and leaving from the data files;
- 2) calculating average hospitalization period using the Board's central computer;
- 3) examining the applicability of higher nursing care charges, and calculating possible increased charges.

The computer examination showed that the Hospital could have increased medical revenue by ¥70.64 million in FY 1991 and 1992 by applying higher standard nursing care charges.

B. Processing of University Hospital medicine purchasing files

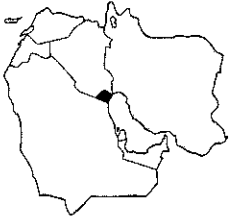
The Audit Board processed 14 State university hospitals' 40,000 medicine purchasing contract data records by:

- 1) converting medicine purchasing contract data (names of medicines, amount paid, dates of contract/delivery/ payment etc) appearing in papers submitted by State University hospitals into magnetic data for processing on micro computers;
- 2) using micro computers to produce tables showing irregular accounting/payments, particularly cases in which contract completion and payment were made over two fiscal years (eg contract completed in FY 1992 and paid in FY 1993) and cases in which the cumulative contract amount exceeded allocated budget etc.

The examination revealed over-contracting/two-fiscal year accounting amounts totalling ¥8,179 million made during the four fiscal years 1989 to 1992. The computer-produced tables further classified these irregularities by type of contract (unit-price contract/gross amount contract), delivery-payment interval, names of purchased medicines etc.

Note: The Japanese Public Finance Law states that payment in a specific fiscal year (April 1 to March 31 next year) should be made from the revenue of the same fiscal year. The Japanese Public Account Law states that Contract Officers should not conclude contracts exceeding the itemized budget allocated by the head of Ministry/Agency he works for.





KUWAIT

The State Audit Bureau of Kuwait has established a new Directorate for Investments.

The main role of the Directorate is to follow-up investments of public money in real estate, shares and bonds, deposits, loans and currencies and some other banking operations. It is also responsible for auditing the trading in valuable metals and all other investments involving public money greater than 25% of total.

The Directorate receives detailed statements on each type of investment from the minister supervising the responsible body. Following audit, the State Audit Bureau produces a report every six months concerning each investment, which is presented to the National Assembly.

The new Directorate uses computers extensively to process data and records and assist audit work. It has four PCs including a file server operating a small local area network, and a further 19 486 PCs. Software used includes Unix, MS-DOS, Windows, Informix and Excel.

The software is also being used to create a database for the State Audit Bureau. Data held can be analysed and displayed graphically.

The 18 employees of the new Directorate are receiving detailed training at the National Centre for Information Systems, Kuwait University and other specialist centres. This will give them an understanding of modern investment methods, and enable them to use technology for financial analysis and evaluation.



SWEDEN

New IT function in The Swedish National Audit Office

The Financial Audit Department of The Swedish National Audit Office plans to ensure that as many auditors as possible will be able to undertake IT auditing in one form or another. To achieve this aim an IT function has been created. The IT function runs major projects of its own and also provides support for projects run by the sections within the department. The IT function consists partly of specialists and partly of auditors who undertake financial auditing in the department. This combination allows skills and experience to be spread and maintained in the sections. In this way the issue of IT knowledge being restricted to a small group of specialists has been avoided.

Security by Analysis

The Financial Audit Department now intends to carry out SBA (Security by Analysis) examinations of information systems at its auditees. SBA is a method which was originally produced by the Swedish Vulnerability Board in the beginning of the 1980s. This method is now being revised. The great advantage of this method for auditors is that the analysis can be performed quickly, and can result in a concrete plan of action which the auditors can follow.

EDI, controls and auditing

EDI (Electronic Data Interchange) is now of a subject of interest for many SAIs. The Financial Audit Department has produced a report on EDI, controls and auditing. The report analyses this area from segment level up to agreements between two communicating partners. The points of departure are the requirements of the law and demands for good internal controls. Contact person: Peter Nilsson.

Systems maintenance

During the spring the Performance Audit Department of The Swedish National Audit Office will complete the first audit in a series covering the systems maintenance work of government agencies. Attention has been paid in particular to measures taken by agencies to minimize risks of shortcomings in the quality of this work. The first system to be audited is the national system for the documentation of students' examination results, LADOC. More systems will be audited in the future. When the series is complete an overall report will be written which

will describe all the experience gained from these audits. Contact persons: Hubert Mille, Karin Coster and Björn Undall.

Management of IT

The Performance Audit Department has audited the management and use of IT based information systems at civil agencies. It found that the difficulties experienced in managing this area are linked to a general lack of skills and qualifications in the IT field in the agencies. The audit proposals are being considered at government level. SAI Sweden has also proposed that a training programme for agency management should be designed. Contact person: Bengt E W Andersson.

Quality Assurance in IT projects

During the last two years the Performance Audit Department has audited three major and one minor systems development projects from the perspective of quality assurance in these systems. The experience gained is at present being documented in an overall report which will be published during the autumn. Contact persons: Hubert Mille, Lena Lindstrom and Björn Undall.

UNITED KINGDOM

Audit of risks posed by key Financial IT Systems

The UK NAO have produced an audit programme guide aimed at helping auditors identify, assess and audit the risks to financial accountability posed by key financial IT systems.

The guide has a two stage, top-down approach. Part 1 helps the auditor review, at entity level, the management environment within which IT systems are planned, developed, operated and monitored. The objectives being to consider whether management's control over IT appears to be sound, and to judge whether any significant risks seem to have been overlooked or ignored.

Part 1 also helps the auditor produce an inventory of key financial IT systems, classifying them according to whether they are stable, under development, under strain or undergoing major change. Risks to financial accountability will vary depending on which category a system falls into, and the quality of the management environment within which it operates.

Part 1 informs the auditor's decisions about which audit approach to adopt, and provides a systematic basis on which to assess risks which may require further audit investigation or comment. If this proves necessary, Part 2 of the guide provides a compendium of audit procedures to choose from in order to test whether the risks have matured, and to obtain evidence on which to base a management report. The audit procedures are grouped under the category headings set out in the Part 1 system inventory (see above paragraph) so that audit work tests the sorts of risks which might be expected in systems under strain as opposed, for example, to those under development.

Outputs from the guide are expected to be input to certification audit planning; reports to management reflecting the systems work undertaken and results of audit testing; and a better overall understanding by the auditor of how IT fits with the organisation's activities, and how IT is controlled.

Development of Financial Audit Software

Over the last two years the UK NAO has been redesigning the computer tools provided to auditors for use in their work. The new 'audit toolkit' will complement the comprehensive central IT facilities which are available to all staff.

After developing a business case for an audit toolkit, the development team was tasked with providing a set of comprehensive tools for use on notebook computers, using tried and tested software as far as possible. The objective was to introduce tools that would bring real benefits to the audits and most importantly ensuring that all developments were driven by the auditors.



Development lasted 18 months. In the prototyping stage, a sample of audit teams were provided with a selection of software packages to test. They advised on the most appropriate packages and combinations of software. The pilot stage lasted for nine months and was completed in March 1994. It used five audit teams and a panel of audit staff to refine the selected audit toolkit. Based on their comments, criticisms and enthusiasm, the final stage of the project is in hand - full implementation to all audit teams in the NAO over the next 2 years.

Essentially audit staff can document the whole audit process: planning, audit work, evaluations and the review process. They are also provided with word-processing and spreadsheet facilities that are compatible with the central system.

The audit toolkit comprises a number of software packages which have been integrated together. For example, BRS/Search is used to provide databases of reference material as on the central system (see article on page 13). IDEA5 is used for interrogation and sampling, as in many other SAIs, for example Canada and Sweden (see articles in this issue).

The NAO is investing heavily in Notebook computers for audit staff to run the toolkit. The computers can also access the central IT system, both to work normally, and to up and down load information and data for use in the toolkit when away from the office.

The development of the toolkit has always been audit rather than technology driven. The guiding principle has been to ensure a SAFE product: Simple, Adaptable, Flexible and Easy to use.

ZIMBABWE

The Office of the Comptroller and Auditor General of Zimbabwe has been "into IT" for the past two years, with a modest hardware configuration of 26 desktop and 20 laptop computers, sharing 9 printers.

The 228 members of the Office use mostly WordPerfect 5.1, followed by Excel 4.0 and dBase IV. Wholesale use of IDEA 4.1 has been restricted by insufficient skills and difficulties experienced at the beginning in transferring data from the Central Computing Services (which provides computing services to the whole Government) to the office's computers. The problem of skills is being addressed through on-going training and to date, 50% of the officers have been trained. The problem of data transfer has been resolved through co-operation with CCS and currently, data for all central Government departments is being transferred to the office on a monthly basis.

Currently, the Office is eagerly awaiting the finalisation of the 1993/94 audits when the following will be done:

- an evaluation of the use IDEA and identifying new areas of use;
- an evaluation of the Excel Macros developed by the Office which will be used to prepare the accounts;
- the production of the Report will, for the first time, be done in-house;
- an evaluation of the impact IT has had on the office and its direction in the future.

Our next issue is planned for Summer 1995. It will feature articles on:

- ***the use of IT in another SAI***
- ***developing IT Strategies***
- ***results of the INTOSAI EDP questionnaire***
- ***Information System Security Review and Methodology***

Plus IT audit news from SAIs around the world