

FROM THE OPTICAL DISC PILOT PROJECT AT UNOG TO AN OPTICAL DISC SYSTEM FOR THE UNITED NATIONS

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SUMMARY

The Inspectors adjudge the optical disc pilot project at UNOG to have been a success and endorse the UNOG Interdepartmental Working Group's recommendation that the 1990-1991 United Nations budget fund it on an operational basis in Geneva. The Inspectors were particularly struck by the implications of the project, above all by the convenience and savings it promised to the missions of Member States of the United Nations. For very little expenditure each mission could receive and print in its own office whatever conference documents were in the system. In that connection, major savings and improvements in efficiency were certain to accrue when all conference documents (from the beginning of the organization) were entered on optical discs (at an estimated contractual cost of some \$US 5 million). Other implications include the extension of the system beyond missions to the specialized agencies, capitals of Member States, educational institutions, libraries and United Nations system field offices.

These future developments were made possible by the linking of high speed transmission with an optical disc system whose components were interchangeable and compatible with existing electronic data processing equipment. Progress would not have to be limited by the shortcomings or research failures of an individual system.

I. INTRODUCTION

1. The Joint Inspection Unit in its report on "Problems of storage and its costs in organizations of the United Nations system" (JIU/REP/86/9), prepared in response to the interest expressed at the fortieth session of the General Assembly, included among its recommendations the following:

"The optical disc-based system being most promising in resolving the problems of storage and retrieval of documentation, a test project of this system should be initiated as soon as possible. To achieve maximum efficiency and savings, this project should be authorized for UNOG, both in the Publications and Library Services where the storage facilities are the most deplorable." (Recommendation 7);

"An appeal should be launched to Member States, either to make advance contributions to the regular budget (to be deducted from their future contributions) or voluntary contributions for the purpose of introducing the optical disc-based system." (Recommendation 9 "c").

2. These recommendations were formulated following the Inspectors' review of storage problems in the United Nations system and their analysis of a number of alternative means to cope with them. In this earlier report, the Inspectors concluded that limitation of documentation, relocation of space and even new construction, while being necessary in some cases, could not provide a complete solution to these problems. The Inspectors were informed that the storage problems occurred in part because the organizations of the United Nations system were not equipped with the facilities for massive storage and quick and efficient retrieval of the information contained in the libraries, archives, documentation and publication services. Therefore, they felt that the best solution would be the application of new technology in a co-ordinated, cost-effective way.

3. Having carefully examined additional information on the possibilities of the optical disc technology, the Inspectors came to a firm conclusion that the concept combining optical disc technology and long-distance high-speed data transmission would not only revolutionize the current production, storage and distribution of documents but also promised to result - once fully implemented - in increased productivity and massive savings in paper, machinery, staff, postage costs, storage space, etc. (which, in the final analysis, will significantly bring down conference costs).

4. Thereafter, in the Addendum (JIU/REP/87/6) to the above (basic) report, the Inspectors confirmed their recommendation 9 with respect to authorizing the pilot project at minimal cost, and urged the General Assembly to arrange its funding. The Inspectors suggested that the General Assembly might wish to consider launching an appeal to Member States to contribute in cash, or in kind, as also mentioned by the Secretary-General (see A/42/295, para. 21).

5. The reaction of the organizations of the United Nations system to the JIU recommendation concerning the optical disc test project was generally positive. It was welcomed by the Administrative Committee on Co-ordination (see A/42/673), the Advisory Committee on Administrative and Budgetary

Questions (A/42/7/Add.2) and the Secretary-General of the United Nations who in his comments (see A/42/295, Annex) recognized the desirability of undertaking a test of the potential of optical disc technology. The General Assembly, in its resolution 42/225, took note of the basic report and the Addendum.

6. In December 1987, the Government of France, responding to the aforementioned appeal (see para. 4), offered to provide as a voluntary contribution the hardware and software - valued at \$US 500,000 - necessary to implement at UNOG a pilot project for the storage, remote retrieval and long-distance high-speed transmission of conference documents. This generous offer opened the way to the implementation of the Inspectors' recommendation concerning the pilot project. Accordingly, the latter was started at the beginning of April 1988 following authorization by the Secretary-General. An Inter-departmental Working Group was established at UNOG to monitor it and to formulate technical and practical criteria for its evaluation as well as to make recommendations for an operational system. In May 1989 the Working Group reported on the success of the pilot project and recommended proceeding in the 1990-1991 budget of the United Nations towards a fully operational system.

7. The present report has been prepared pursuant to General Assembly resolution 42/218, which expressed the conviction that "more systematic follow-up activity regarding the implementation of recommendations of the Joint Inspection Unit would increase the usefulness of the inspection function". Therefore, the report is designed to accomplish the following objectives:

(a) to review the results of the implementation of the pilot project in terms of the possibilities and advantages of storing conference documents on optical discs, transmitting and accessing them from remote locations (other United Nations system offices, missions, governments, institutions, etc.) on screen or as computer print-outs;

(b) to assess potential United Nations system-wide applications of optical disc technology in conference services and other areas, such as records management, administration, budget and finance and information processing;

(c) to review the proposal for setting up an operational system in the light of realistic estimates of installation and running costs;

(d) to ascertain the interest and activities of the United Nations specialized agencies in the field of optical disc technology as of August 1989; and

(e) if the operational system is endorsed, to suggest ways and means of realizing maximum savings as rapidly as possible.

The above objectives are treated in the following order:

- objectives (a) and (b) - Chapter II
- objective (c) - Chapter III
- objective (d) - Chapter IV
- objective (e) - Chapter V

8. The Inspectors thank those officials of the United Nations organizations who contributed to the preparation of this study for their kind co-operation and useful observations.

II. REVIEW OF THE PILOT PROJECT

A. Goals and expectations

9. At the commencement of the pilot project in April 1988, its three major goals were formulated as follows:

(a) to demonstrate the feasibility and advantages of storing conference documents on optical discs and accessing them from in-house and remote locations both on screen and by laser print-out;

(b) to evaluate the installation and running costs of an operational system and the savings it would entail; and

(c) to determine potential applications of such a system in other areas of the Secretariat.

10. In its essence, the project aimed at demonstrating the possibility of establishing networks of retrieval stations and servers with on-line disc drives and jukeboxes connected by high-speed telecommunications to provide all users direct access to United Nations conference documents. Such a system of electronic distribution on demand was expected to reduce appreciably the production of paper documents.

11. Behind the whole project was the assumption that in the not too distant future work stations consisting of personal computers (PC) and printers would be as commonplace in offices as telephones today. With that expectation, it would be sensible to try to integrate from the start a capability to access directly United Nations documents from ordinary computer and office automation systems. Thus the use of optical discs and high-speed transmission could entail savings not just for the United Nations but for other users as well. Many government missions, for instance, have their own reference services for United Nations documents. With the kind of system envisioned, these would largely become unnecessary, since a simple retrieval station, consisting of a PC and a printer, would make direct real time access to documents possible at all times. Moreover, as each retrieval station would have its own built-in memory a document called on a terminal could be: (a) consulted on the screen; (b) printed out in paper form; (c) stored in the memory for future use; and (d) transmitted to another work station (users would thus be able to exchange documents on their work stations, which in itself could entail considerable savings).

B. Project equipment and its potential

12. The combination of hardware, software and expertise offered by the French Government had two attributes: first, the expenses to the Organization were negligible; second, the configuration was an open system which did not commit the United Nations to future choices of equipment.

13. The system as installed comprised:

- an inputting, storage and retrieval station in the Distribution and Sales Section at UNOG, consisting of a high-speed laser scanner, a PC/AT with a 40 Mbyte hard disc and a high definition screen (for intermediate storage and consultation), a 40 Mbyte PC/AT with monochrome EGA screen for the loading of optical discs and use as a server, two disc drives (for writing and reading on optical discs), and a laser printer;
- a retrieval station at UNOG consisting of a PC/AT with a 20 Mbyte hard disc, a high resolution screen and a printer;
- a similar retrieval station in Conference Services at Headquarters in New York with a 40 Mbyte hard disc, a high definition screen and a printer;
- a similar retrieval station in the Permanent Mission of Guatemala at Geneva (PC/AT with a 20 Mbyte hard disc, a high definition screen and a laser printer); and
- a "jukebox" located in Paris, accessible through a 64 kbits/s data link 1/.

In addition to the project equipment, a work-station with a 60 Mbyte hard disc was installed in the Permanent Mission of France in Geneva.

14. A noteworthy characteristic of this system was its combination of the optical disc technology with high speed long-distance data transmission. The joint evaluation of these combined technologies makes it possible to assess:

- the benefits which the implementation of such a system would bring;
- the constraints of operating such a system and the means needed to cope with them;
- investment and operating costs;
- organizational changes induced by such a system, particularly with regard to the users of conference documents (United Nations Secretariat, the specialized agencies, missions and governments of Member States, educational and other institutions); and
- the conditions under which the system can be integrated in the existing information processing and office automation context of the United Nations.

1/ The rationale for using a jukebox located in Paris was threefold:

(a) it made it possible to test the effectiveness of high-speed (64 kbits/s) transmission of conference documents over long distances between several locations (Geneva-Paris-New York); (b) it relieved the UNOG staff during the pilot project of all tasks related to the technical maintenance of the jukebox, which is the most vulnerable part of the whole configuration; and (c) it enabled the donor Government to absorb transmission costs during the implementation of the pilot project.

15. The first function of the system - inputting of United Nations documents on optical discs - is possible either through scanning of paper documents or directly from word processors. In this connection it should be noted that one side of a disc (one gigabyte) can store up to 30,000 scanned pages or 200,000 pages in coded form (e.g. produced by a word processor). One jukebox of the type used in the pilot project can hold as many as 100 discs and thus store about six million scanned pages or 40 million pages of coded text. New 6.4 gigabyte discs which have been announced for availability shortly can store three times this volume. A retrieval station can search for and display a document on the screen or produce a print-out in a matter of seconds.

16. The second function ensures transmission, irrespective of the distance, of digitized documents stored on optical discs at the rate of 64 kbits/s (which means that whereas a full page of dense printing as an image may be transmitted in seven seconds a coded text may be transmitted in only a quarter of a second). This makes it possible to build up networks comprising a number of document servicing centres which can be consulted rapidly from authorized retrieval stations whatever the distance between retrieval stations and the servers. It is possible to connect users in most parts of the world to the document servicing centres, thanks to high-rate data transmission networks and to the development of Integrated Services Digital Networks (ISDN), which have been adopted as the new international standard. In Geneva, the newly introduced Swissnet ISDN has already been used to connect missions to the pilot project. With similar developments under way in other countries, ISDN's will be available within a few years in most of the world. If one adds other possibilities - such as dedicated channels - to ISDN's and existing data transmission networks, there will be no major difficulty in connecting users to a United Nations optical disc system of this type regardless of their location.

C. Results of the pilot project

17. The pilot project as originally envisaged has now been fully implemented and the Interdepartmental Working Group has finalized its report. The latter details the results of the experiment, its implications for the future and contains a unanimous recommendation to install an operational system in the 1990-1991 budget biennium.

18. The project demonstrated the possibility of inputting United Nations conference documents on optical discs and retrieving them via high-speed telecommunication links from anywhere in the world with a personal computer (display on screen or paper copy print out). As of June 1989, 120,000 pages of conference documents had been inputted and remote loaded into the jukebox in Paris.

19. Most significantly, two Permanent Missions (France and Guatemala) were connected to the pilot project. Both terminals have been operating satisfactorily. The Guatemala Mission has organized demonstrations of the pilot project for countries belonging to the Group of 77 and also for countries participating in the 1989 summer session of ECOSOC.

20. A number of successful demonstrations also took place in the Palais des Nations, Geneva, and in the New York Secretariat, for officials of Member States, of United Nations agencies, of the Advisory Committee on Administrative and Budgetary Questions and of the Fifth Committee of the General Assembly.

21. At present, advantage is being taken of the availability of the equipment and the possibility offered by the donor Government and the Swiss authorities to transmit documents free of charge on the new ISDN. The intention is to improve procedures, acquire more experience and obtain feedbacks from the missions connected to the project and, finally, to be able to operate the system with minimal delay, should it be approved by the General Assembly.

22. In the opinion of the Inspectors, the first goal of the pilot project has been fully achieved: "to demonstrate the feasibility and advantages of storing conference documents on optical discs and accessing them from in-house and remote locations both on screen and by laser print out". No opinion to the contrary has been heard.

23. In addition, the pilot project proved that the system was, as claimed, an open one and thus compatible with data and word processing equipment presently in use, in particular with IBM (and IBM compatibles) and Wang systems used at the United Nations.

24. Among the numerous advantages which the UNOG pilot project has foreshadowed are:

- immediate availability of conference documents for users;
- savings of space for United Nations distribution sections and libraries in New York and Geneva, one result of which is that it will not be necessary to seek new premises to meet storage needs of the Geneva Library (estimated cost of \$US 8.5 million);
- savings of space in reference and other language services and increased efficiency of these services;
- reduced needs for storage space and staff for external users (particularly permanent missions and governments);
- preservation of the institutional memory of the Organization (particularly for fragile documents or documents of historical value);
- increased revenues through the sale of series of documents on optical support and through the sale of subscriptions for access to the optical disc system (documents and bibliographic references);
- elimination of duplicate storage and processing activities in documentation centres belonging to substantive departments; and
- greater awareness of the activities of the Organization through direct access to the system's documentation by universities, libraries and other institutions.

25. Another intangible advantage of using this technology which is not to be ignored, although difficult to evaluate, is an overall gain in the effectiveness of units and services engaged in handling, processing and using information.

26. The pilot project also made it possible to determine with a certain degree of accuracy the costs to be incurred in realizing these advantages. These would include the acquisition, operation and maintenance of the equipment, the training of staff and paying for transmissions. Details of the costs to be incurred in relation to an operational system, if endorsed, are given in paragraph 37 below and in the Annex.

D. Potential applications of the optical disc technology in the United Nations

27. In the course of implementation of the project it became evident that its application need not be limited to conference documents but could be extended to public information activities (e.g. dissemination of press releases) or the transmission of any type of communication that the Organization needs to disseminate at high speeds to its offices elsewhere in the world or to governments. As networks develop, governments as well as regional economic commissions, the United Nations Office at Vienna, UNDP offices and United Nations Information Centres in the field can be linked to the optical disc system. Communications with the specialized agencies could also be susceptible to major improvements.

28. Simpler applications of a local nature or involving less complex indexing than conference documents would be easy to achieve. Local systems for personnel files, where a simple indexing can be based on the name and index number of individuals, are a clearcut example ^{2/}. A more complex case is that of archives and registry because of the difficulty in properly indexing the material and to control access; however, the wealth of information allowed to lie fallow for many years in the archives of the Organization and its predecessor, the League of Nations, is so great and of such interest to researchers in many fields, as well as to historians, that an effort in this direction would be warranted in the near future.

29. Generally speaking, there are applications for optical disc technology whenever large quantities of documents have to be stored and made available for consultation. One interesting aspect is that optical disc technology makes it possible to consult very valuable or fragile documents without having to handle them manually (this applies to both documents of historical value and early documents of the Organization, which tend to disintegrate when touched because they have been printed on poor quality paper). Optical disc technology would also have applications in the field of security enabling, for instance, security officers to check identities, and even signatures, instantly, thanks to the zoom feature of the system. And, as mentioned earlier, there is a market for selling documents and publications produced by the United Nations.

30. The UNOG Library also intends to use the conference documents optical disc system for its own needs, partly because the storage of documents has created problems of such magnitude in recent years. Optical storage appears to be the most efficient and suitable solution for optimal use of available space on the basis of real needs. In the future, not just conference documents but also publications included in the UNBIS data bank (books, periodicals, official publications) could usefully be stored on optical discs.

^{2/} A small test project which took place last year in the Personnel Records Unit of the Office of Human Resources Management showed that, even with a relatively limited optical disc system (analog rather than digital), improvements in managing and processing personnel files could be achieved.

Also of considerable importance is the availability of an enhanced UNBIS system making it possible to associate bibliographic research at all levels of complexity with instantaneous full text retrieval on screen or by laser print-out and to do this with no previous experience.

31. In addition, various programmes could be established to input on optical disc the documents which are consulted most often by the Organization in the discharge of its main functions. This applies to the general collections of the Library as well as the historical archives. The creation of a data bank of the League of Nations archives is contemplated, for which a system similar to UNBIS could be envisaged. The use of such a system by the Library would facilitate both the storage and the retrieval of documents and publications, the overall objective being to develop the Library not just as a storage place for documents, but also as a "processor of information" in its own right to be integrated into the operational activities of the Organization.

* * *

32. In conclusion, the Inspectors consider the UNOG optical disc pilot project to have been successful. It has shown that optical disc technology is a feasible, practical, reliable and cost-effective way of storing documents, and retrieving them quickly both from in-house or remote locations. In the course of the test project the users found the compatibility and "friendliness" more than satisfactory. Moreover, the pilot project has demonstrated that the technology employed has the potential of bringing together three areas of operations of the United Nations Secretariat: administration, records management and information processing, thus promising a substantial increase in the efficiency of these functions, as well as financial savings.

33. Based on the results of the pilot project the Inspectors have no hesitation in recommending that a fully operational optical disc system be installed in the United Nations starting at UNOG during the 1990-1991 biennium.

III. CONSIDERATIONS FOR PLANNING AN OPERATIONAL OPTICAL DISC SYSTEM

A. Configuration

34. The choice of the configuration for an operational system will be determined by a number of factors. The decisive factor must necessarily be the need to find the most cost-effective solution, given the current financial situation of the Organization. This has prompted the Working Group to suggest the early introduction in Geneva of an optical disc system for the storage and long-distance transmission and retrieval of conference documents supplemented by the inputting of New York-produced documents in New York.

35. A second major consideration of the UNOG Working Group was to apply the operational system to new or future documents. This implies that out of 1,000,000 original pages that are produced annually at both duty stations (about 600,000 in New York and the rest in Geneva) the bulk would be inputted on optical discs directly from word processors and, initially, only Arabic, Chinese and Russian originals would have to go through scanning. Obviously, when relevant programmes and fonts are available all documents produced on word processors will be inputted directly in a coded form.

36. According to the Working Group on optical discs, in order to implement the above-mentioned concept and ensure the inputting of the annual production of New York and Geneva conference documents, it would be necessary to install three inputting stations in New York and two in Geneva. To retrieve documents about 100 existing personal computers at Headquarters and 65 at UNOG would have to be equipped initially to double up as retrieval terminals and, within each document servicing centre, two small jukeboxes would need to be installed for storage of less current documents.

B. Cost estimates

37. The UNOG Budget Section estimates (July 1989) the total volume of resources required in the 1990-1991 biennium for installation and operation of the Geneva "document servicing centre" at \$US 1,962,700, the breakdown of which is given in the Annex. In addition, our current rough calculation is that the cost of the New York "document servicing centre" would not exceed \$US 500,000. The estimated total cost in the 1990-91 budget would thus be less than \$US 2.5 million.

C. Estimated savings

38. As mentioned in paragraph 9(b) above, evaluation of the savings that the introduction of an operational system would entail was one of the major goals of the UNOG pilot project. The results of the project have also indicated that an early outcome of the introduction of the system would be improvements in efficiency of the services concerned.

39. As for savings as such, the substantial amount of these can be expected in the biennia following the introduction of an operational system. The UNOG Budget Section has estimated that reduced needs for storage space (including elimination of the need for a new library and document warehousing) would

result in savings amounting to \$US 4,235,000 (in 1981 dollars). Another element of non-recurrent savings which still needs to be estimated is the elimination of duplicate storage and document processing activities in substantive and other departments. (Costs associated with the modernization of the UNBIS system are not taken into consideration because it is the understanding of the Inspectors that these must be incurred in any event.)

40. Recurrent savings are expected to accrue in the 1994-1995 biennium as a result of (a) reduction in press runs, supplies and services (\$US 520,000), and (b) reduced need for labour and other services related to storage, retrieval and distribution of documents (\$US 571,600). Thus the total recurrent savings would amount to \$US 1,091,600 per biennium. (These savings do not include those which would result from the application of this technology to the translation process, savings believed by United Nations Headquarters to be the most rapidly realizable.)

41. In addition, one may expect increased revenues through the sale of series of documents either on regular optical discs or CD-ROM and through the sale of subscriptions for access to the optical disc system. The preliminary estimates show that in 1992-1993 these may reach about \$US 560,000, while after four years of operation of the optical disc system the revenues through the sale of documents on discs or subscription may increase to four times as much. These are net figures which take into account losses in revenue due to decreased sales of microform and paper documents.

42. Although United Nations Headquarters considers these projected savings as overly optimistic in the indicated time-frame, the thrust and direction of the foregoing cost estimates demonstrate clearly the financial advantage to the United Nations that would accrue from an immediate adoption of an optical disc operational system. Inclusion in the 1990-91 budget would advance both the savings and income gains noted in the preceding paragraphs and, in addition, would avoid start up costs and inefficiencies resulting from the termination of the pilot project. In the view of the Inspectors, it would be both economical and wise to merge the continuing project without delay directly and smoothly into an operational system.

* * *

43. Therefore, three general conclusions may be drawn. First, a decision by the General Assembly is needed to authorize an appropriate amount for the implementation of the optical disc operational system in the 1990-1991 biennium. Second, the aforementioned savings, as a result of the introduction of the recommended optical disc operational system, will more than offset the recurrent costs for maintenance and eventually even its initial acquisition cost. Third, should the General Assembly adopt a decision to finance the operational system, the question arises of whether all the existing conference documents (about 40-50 million pages) should be inputted on optical disc. In the case of a decision to input the backlog of existing documents on optical discs the operation probably should be contracted out at an estimated one-time cost of \$US 4-5 million (estimates of the UNOG Working Group) 3/. However, this latter step promises major savings in operating costs and efficiency.

3/ The obvious advantages of this operation are: (a) immediate availability of all United Nations documents; (b) conservation of the Organization's institutional memory; and (c) abandoning the traditional system of storage and retrieval.

IV. AGENCIES' VIEWS AND ACTIONS

A. General observations

44. The JIU Inspectors in their report on "Problems of storage and its costs in organization of the United Nations system" (JIU/REP/86/9) suggested that agencies observe the results of the test project at UNOG in order to be in a position to benefit from a system which can interface existing and future technologies and permit using documentation and facilities of other organizations. Aside from WIPO, whose technical requirements were unique, (see paras. 48-57 below) none of the agencies has taken major steps towards the acquisition of such an optical disc system.

45. However, during two recent sessions of the Inter-Agency Meeting on Language Arrangements, Documentation and Publications (IAMLADP) (June 1988 and June 1989) at which reports on the possibilities of optical disc technology and the UNOG pilot project were discussed, many representatives of the specialized agencies expressed the wish to use the findings of the UNOG pilot project to advance their consideration of the adoption of optical disc technology. WMO supported the view at IAMLADP that, in accordance with the findings of the UNOG pilot project, an optical disc system should be fully adopted by the United Nations as soon as possible.

46. The sampling of opinion conducted by Inspectors in August 1989 revealed much favourable reaction among the agencies. FAO maintains a keen interest in the use of electronic media for storage, retrieval and archiving of documents and closely follows progress on this subject. UNESCO, although at an early stage in its projects, is hoping to join with other organizations and shows great interest in the UNOG test project and in what WIPO is currently undertaking. UNICEF intends in the near future to appraise the potential for optical disc technology in the light of UNOG's experience. Although without an immediate need for the technology, IMO and UPU are following developments in the optical disc field. Many agencies are employing optical disc technology by utilizing or planning soon to utilize, CD-ROM based systems. These include FAO, IAEA, ILO, UNESCO and WHO.

47. In 1987, WHO made a major study of the use of new technology to support the preparation, production and dissemination of WHO documentation. The study recommended that the use of optical technology be pursued in specific application areas, such as records management. Given the cost of the optical equipment at the time this was being considered, acquisition was not then considered feasible. However, with current decreases in the cost of optical technology products, this study is being revived. A number of other agencies and organizations have also begun to move out of the planning phase. Thus ITU has, for the past two years, been studying the feasibility of introducing optical disc technology, and a pilot project is envisaged in the near future. UNIDO is at present actively evaluating acquisition of an optical disc storage system, primarily for its registry and archives. It also believes that an optical disc document storage system would be of great benefit to the joint United Nations/UNIDO Languages and Documentation Services, which are currently operated by UNIDO under a cost-sharing

arrangement with the United Nations. This would also solve the current problem of UNIDO's Reference and Terminology Unit (RTU), which has run out of document-storage space. Through the use of an optical disc document storage and retrieval system, it would be possible to streamline RTU operations, eventually eliminating the need for staff recruited solely for manipulating paper documents. ICAO intends to provide resources, with the same aim in view, in its 1993-1995 budget. In IAEA, the Records and Communications Section, at present, is studying optical technologies with a view to considering a change from microfilm to some modern archival media. With systems costs already decreasing and applications becoming increasingly flexible, it is believed that such systems could be even more cost effective, save human resources and speed up transactions if a co-ordinated approach is taken, combining records management needs, procurement matters and personnel-related activities. IAEA's Computer Section has also established a task force on optical technologies to follow and study developments in this field and to make proposals for application in the Organization. Finally, ITC intends to introduce the optical disc technology on a wide scale in the near future and has already carried out tests in its African and Latin America regional offices.

B. Special case and experience of WIPO

48. In parallel with the review by the JIU Inspectors of the advantages of optical disc technology and the preparation of their reports dealing with this subject, WIPO developed a proposal to install and start operating an optical disc system. The competent governing body - the Assembly of the Madrid Union - approved that proposal in September 1987. A number of factors contributed to this decision.

49. The first factor was the rapidly growing problem of WIPO files concerning international registration of trademarks. At present, there are about 280,000 such files containing 4,200,000 pages of information. These paper files are kept in a compactus storage file. Those files not renewed upon expiry of registration (on average 6,000 per year) are removed from the compactus, the papers they contain are copied onto microfilm and the papers themselves are destroyed. This is undertaken in order to save storage space. However, new registrations (currently 15,000 per year) exceed the number of files destroyed annually by some 9,000. As a result, the number of paper files continues to grow and more and more space is required for their storage.

50. The second factor related to manipulation difficulties. Accessing and controlling the circulation of individual files is cumbersome and time consuming, particularly when several staff need to consult the same paper file at the same time.

51. Some risk to the security and integrity of files as a result of frequent manipulation and circulation constituted the third factor.

52. Therefore, for a number of years, WIPO had been examining new technologies in order to achieve the following objectives:

(a) to eliminate the need for paper files, at least for normal, daily operations;

(b) to preserve the full content of the paper files in a much smaller space;

- (c) to make the content accessible by machine;
- (d) to facilitate updating of the files and to increase their security;
and
- (e) to find a method of preservation of the files which could be further transformed by machine in order to be able to take advantage of future, as yet unknown, technologies.

53. The examination undertaken by WIPO led it to the conclusion that an optical disc system was an appropriate technology for achieving those objectives. The optical disc system to be installed at WIPO would:

- (a) gradually transform and replace the existing paper files for international registrations, thus simplifying and making more efficient file management and storage, increasing the security of files, and enabling the present compactus gradually to be phased out, thus freeing office space;
- (b) simplify the work of examining applications for international registration, renewals, refusals and modifications since the staff would be more easily able to access, electronically, the complete file concerning an international registration; and
- (c) improve the production of the corresponding notifications and the pages of the monthly gazette since the associated "electronic publishing" photocomposition system would be able to produce the printing matters, including the figurative elements of marks.

54. The first part of the optical disc system, consisting of the sub-system for entering, sorting, retrieving and consulting images, is expected to be installed before the end of 1989. The second part of the optical disc system, consisting of the "electronic publishing" sub-system for producing the printing masters for the notifications and the pages of the monthly gazette, is expected to be installed early in 1990.

55. It is particularly instructive to note that estimates made by WIPO show that the benefits of the optical disc system would be considerably greater than its costs. Savings are expected to accrue as a result of having less storage space and lower printing costs.

56. At present, WIPO is also proposing to develop another optical disc system for improving the operations of the Patent Co-operation Treaty (PCT), and documents describing such a system will be considered by the Assembly of the PCT Union at its session to be held in October 1989.

57. The Inspectors observe that the system adopted by WIPO supports their conclusion that optical disc technology is the right answer to cope with the problems of storage and retrieval of documentation in organizations of the United Nations.

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58. In conclusion, the Inspectors recognize that the move to adopt optical disc technology has, during the last two years, become more pronounced. Since the results of the UNOG pilot project are now available the agencies will wish to take its findings into account and especially to be mindful of the benefits they will derive if their systems are compatible with whatever systems may be selected for use in the United Nations Secretariat and permanent missions of the Member States.

V. CONCLUSIONS AND RECOMMENDATIONS

59. Based on the results of implementation of the optical disc pilot project at the United Nations Office in Geneva, the Inspectors conclude:

(a) the pilot project as originally envisaged has been successfully implemented;

(b) it has demonstrated the possibility of inputting United Nations conference documents on optical discs and retrieving them in real time from in-house and remote locations;

(c) the equipment employed has proven to be fully compatible with existing equipment and "user friendly";

(d) the missions connected to the pilot project have considered its operation to be highly satisfactory; and

(e) the pilot project has demonstrated that the technology employed may be equally successful in archives, registries, libraries, personnel and administration services. The potential of bringing together three major areas of operations of the United Nations Secretariat: administration, records management and information processing, promises a substantial increase in the efficiency of these functions, as well as substantial financial savings.

60. Therefore, the Inspectors further conclude that there is a need for an operational optical disc system, as described in Chapter III(a) to be installed in the Secretariat as soon as possible. The Inspectors, noting the estimates of installation and operational costs of the system, prepared by the UNOG Interdepartmental Working Group on optical discs and the UNOG Budget Section, as well as the potential savings as a result of the introduction of the system, bring to the attention of the General Assembly the fact that the latter will more than offset the recurrent costs, the maintenance of the system and eventually even its initial composition costs.

61. Regarding the inputting of all existing conference documents on optical discs (40-50 million pages), it is the Inspectors' view that this one time labour intensive operation should be pursued with vigor, either by mobilizing existing Secretariat resources, or, if this proves impractical, by contracting for the services. Initial investigations undertaken by the UNOG Interdepartmental Working Group on optical discs suggest that it is possible to have this work done at approximately \$US 0.10 per page, which means that the total cost of this operation would amount to some \$US 5 million. These expenses, however, should be set against the advantages which will result, namely (a) all the conference documentation will become readily accessible worldwide; (b) the institutional memory of the Organization will be preserved; and (c) there will be a possibility to switch, almost completely, to electronic distribution of United Nations documents. Finally, a substantial part of the cost will be offset due to reduced need for storage

space, and income could be generated by the sale of CD-ROM; and access to the optical disc system on a subscription basis. In the medium-term this one time operation would thus yield savings plus income, as well as resulting in a general increase in the efficiency of Conference Services.

62. In the course of the contacts which Inspectors have had with officials of specialized agencies of the United Nations system the latter displayed keen interest in adopting optical disc technology and building on the results of the UNOG pilot project.

63. In view of the above conclusions the following recommendations are made:

RECOMMENDATION 1: A fully operational optical disc system for storage and retrieval of recent and future documentation should be installed in the United Nations Secretariat. The General Assembly may wish to provide in the 1990-1991 budget appropriate resources for such a system.

RECOMMENDATION 2: Should the General Assembly adopt recommendation 1 and United Nations Secretariat in-house resources prove insufficient, it may wish to consider the possibility of contracting out the inputting on optical discs of all existing United Nations documentation which will allow the preservation of the institutional memory of the Organization, the ready availability of all United Nations documentation, and substantial additional savings.

RECOMMENDATION 3: The legislative bodies of the agencies of the United Nations system may wish to consider the possibility of installing operational systems of their own. In this eventuality, the results of the UNOG optical disc pilot project should be utilized. Paramount consideration should be given to ensuring the most cost-effective configuration compatible with those to be installed in the United Nations Secretariat and the permanent missions of Member States.

Installation and operation costs of the recommended
United Nations optical disc system

I. Geneva "document servicing centre"

1. (a) <u>Non-recurrent costs</u>	<u>Shared devices</u>	\$US
i.	two on-line disc drives for 6.4 gigabyte discs, with necessary software	100,000
ii.	two inputting modules	83,300
iii.	two retrieval workstations	65,000
iv.	installation of jukeboxes	80,000
v.	multiplexing devices (3 units)	82,000
vi.	software for direct transfer of documents from word processors to optical disc and development	120,000
	Sub total	530,300
		=====
(b) <u>Programme's own devices</u>		
vii.	software for retrieval stations	75,000
viii.	boards to enable PCs (30) to double as optical disc terminals plus software	180,000
ix.	high definition screens (16)	60,000
x.	laser printers (20)	70,000
xi.	lines for retrieval stations (30)	100,000
	Sub total	485,000
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2. (b) <u>Recurrent costs</u>		
xii.	rental and maintenance of two jukeboxes	292,000
xiii.	general temporary assistance	228,400
xiv.	supplies (blank discs, paper, tone for printers)	160,000
xv.	insurance	1,500
xvi.	maintenance of other equipment	111,500
xvii.	replacement of equipment	154,000
	Sub total	947,400
	Total (Geneva)	1,962,700
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II. New York inputting centre	(estimated)	487,300
	Total	2,450,000
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