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THE INTEGRATED INFORMATION SYSTEM OF THE ARCHIVES OF MACEDONIA[1]

This paper presents the current status in the development of the Integrated Information System which is set up for the needs of the Archives of Macedonia. Yourdon's Object Oriented Approach – OOA and the client-server methodology are used in developing the model. The preliminary exploitation results comply in full with the demands set up in the design project. The implementation of the system enabled a modernization in archive work, application of current mass storage media and efficient multi-criteria methods for data searches. The computerized link of the central unit with the local departments and their connection with the creators and holders of archive materials will enable an integration of an archives data base, while the integral approach to the protection of archive materials will be implemented through the structural integration of this system with the security system and the automatic climate control system for the repositories.

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[1] Izlaganje s godišnjeg savjetovanja Hrvatskog arhivističkog društva i Odbora za informatičku tehnologiju MAV-a, održanog u Bizovcu u listopadu 1997. godine, s temom Elektronički zapisi i informatizacija arhiva (*Electronic Records and Archival Automation*).

1. INTRODUCTION

The implementation of computer information systems in archive work appears as an inevitable step towards their modernization and connection within the context of the new "information" society.

The study on the implementation of a unique information system for the Archives of Macedonia is the first document that analyses and sets up the relations, elements and activities of the archive service in Macedonia from the aspect of a computer supported system for providing the security and protection, micro-climate and information subsystem for archive materials and facilities of the Archives of Macedonia (Nikolovska – 91, 92). The prepared Study is especially important under conditions when the modern function of the archive service is the result of historical development and the awareness about the importance of archive materials in overall modern life (Nikolovska, Iliev and Asprovska – 94).

The expansion of the functions and importance of archive materials and the Archives must be followed with the appropriate development of knowledge and assessments regarding everything that must remain as archive material and needs a lasting preservation (Stulli, B. 77). This, on the other hand, has the consequence of a gradual reduction in the rights of the creators and holders of documented and archive materials in their decisions how to keep, document and select the material which is and would be created through their work. It is foreseen for the future to significantly shorten the deadlines for availability of archive materials for public use (Dojcinovski – 96).

With the collection, admittance, documenting and lasting storage of archive materials starts also its complex physical security and technical-technological protection and maintenance, aimed at stopping or preventing the processes of its attrition and destruction, as a unique, lasting and unrepeatable testimony about the life and actions of the people in the territory.

As the main user of the archive materials, science dictates fast, precise and modern directions for archive materials as information bearers. Therefore there arises a focused attention at the Archives of Macedonia on the methods, principles and manner of arranging and scientific processing of archive materials, based on own experience, but also on international experience and knowledge.

2. PRELIMINARY RESEARCH

The conceptualization of methodologies for efficient administration of archives appears at the beginning of this century in Great Britain (Jenkinson – 22), while the works of Cook (Cook – 77, Cook & Grant – 85) presents a modern and currently relevant approach to the administration of archive materials. This basically pragma-

tic approach draws its experience form smaller organizations and through a scientifically supported generalization, it sets up the basics of modern archive work. This direction was later supported by numerous research work in this field (Roper – 72, Evans – 83, Posner – 76). They raise the level of archive work from mere preservation of documents and their use, mainly for historical research, towards a public service for current administration and citizens. In this way an integral approach was made possible towards the research of historical and current archive materials.

The development of computers at the end of the sixties, and of the media for mass data storage and processing, gives the stimulus for the development of new conceptual models for efficient archive administration (Shellenberg – 75, Benedon – 79). Still, the implementation of computer systems becomes attractive in this field at the beginning of the nineties, as a result of: the sudden fall in prices of mass data storage media, of the new user-based operational systems, development of application programmes for multi-media data processing (processing of text, picture, sound, etc.).

As one of the currently most relevant problems in the implementation of computer systems for archive work is the problem of data search. The problem arises from the impossibility to set up archive materials in an efficient structural framework (categorization) which would meet the needs of various kinds of historical research (Cook – 85), (Dojcinovski et al. – 96), the lack of precision in the presented data, overlapping, non-existence of a uniform terminology and search procedures. This problem is known as interdisciplinary searches (Weisberger – 93). The implementation of the concept of fuzzy sets (Chang – 92) and the cognitive sciences (Kuhlthau – 93) give a solid base for the development of efficient algorithms for interdisciplinary searches. At present, there are three different methods for solving this problem:

– Method of weight vectors

In this method, documents are represented as weight vectors in models based on the frequency of appearance (Forsyth & Rada – 86), (Salton – 70), binary probability models (Wong & Yao – 90), non-binary represented probability models (Meng & Park – 89), and fuzzy logic-based models (Salton – 83, Zadeh – 89). In agreement with this, searches will depend upon the value of the similarity function (metric distance) between the vector representations of the documents and the questionnaires.

– Method of sentence collection

This method uses a model of logic information models (Van Rijsbergen – 87), where a premise is defined based on which the questionnaire can be derived.

- Application of artificial neuron networks

  This method uses models based on artificial neuron networks (Kwok –
  89), where the search is reviewed as the spreading in activation of an inter-
  active three-level neuron network, while the learning process is based on
  the back-propagation method.

  Therefore the joint principles on which these methods are based are:

- Documents and questionnaires are reviewed as two different and independent en-
  tities. There is no effective link (of any type) between them.
- The search is a process that is initiated by a unique questionnaire based on a
  unique and closed set of documents. The search does not imply interaction
  between these two categories.
- The relevance (which represents a critical parameter in modeling, i.e. whether a
  document is relevant or not for the defined questionnaire) is reviewed as a third
  entity that needs to be known *a priori*.

  This model can be shown in the following structural scheme:
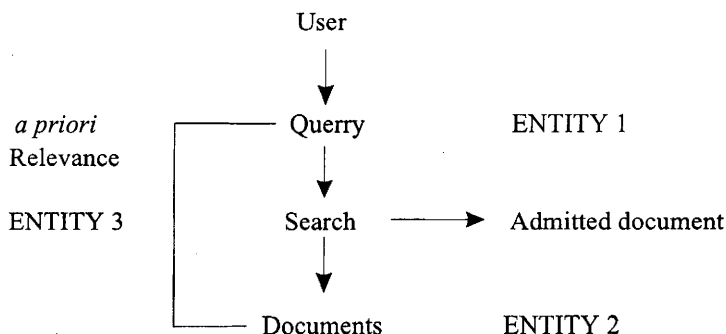
It must be stressed that the application of these methods is connected with pre-
vious theoretical and applicative research in order to get the optimal solution for the
structural set up of archive materials.

3. INTEGRATED INFORMATION SYSTEM

By means of object-oriented analysis of the Archives of Macedonia (which co-
vers its structural, functional and behavioral aspect), the basic directions of develop-
ment of the informational model of the Archives were derived. The structural model
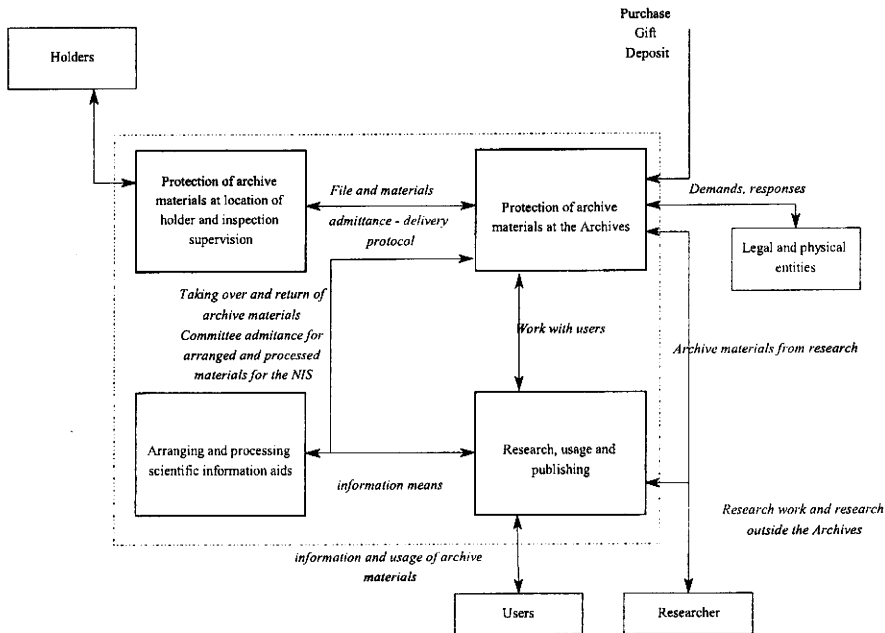of the Archives is shown in Figure 1.

Figure 1. Structural model of the Archives of Macedonia

The functional analysis showed that this is a complex mutually interlinked system with three subsystem units and a very expressed subsystem interaction. As a residue from the legal regulation from the previous system, numerous discrepancies still come through, mainly from the functional aspect, and because of the relatively low level of equipment, the manipulation with information means is inefficient. The analysis showed that the human factor also (mainly for objective reasons) is a frequent cause whose correction is long-term and complex. In global, the following problems have been disclosed:

– optimal planning of visits to holders;
– more difficulties in controlling the delivered plans and holder lists;
– problems with the handing over of archive materials;
– control over issued and returned materials;
– wrong maintenance of documentation and loss of data on the materials;
– unauthorized access to data on the fonds that have strategic importance;
– unauthorized visits to repositories;

71

– Physical damage and loss of materials;

– errors in signing, classification and systematization of by-laws, etc.

Especially important is the decision making process for elimination of worthless documentary materials, whose inefficiency consists in the fact that an on-line access is not possible to the data regarding current and similar holdings, which again is reflected in an inflation of documents and data without real information potential.

Based upon the above definition, five basic directions have been drawn for the automation of archive processes:

– control by the creators and holders of archive materials;

– processing of archive materials and preparing scientific information aids;

– searches and discoveries in archive materials;

– linking with the creators and holders of archive materials;

– integration with the subsystems for security and protection and for climate control in the repository.

At present, the first three have been implemented, and the preparation of the main design/implementation project for the realization of the third subsystem is now in progress. The computer link between the creators and holders of archive materials and the Archives of Macedonia should enable an automatic taking over of plans and lists of archive marks, inventory and description of archive materials with lasting value, and inventory of documentary materials that are proposed for rejection. A direct intervention will be made possible for on-site work by the archive services at the holders and providing appropriate solutions, approvals, etc., conform to the legal regulations. In this way, the efficiency will be increased in the operation of the service for working with users, as well as in the degree of primary processing of archive materials. This on the other hand will influence a larger efficiency in the compiling and processing subsystem.

In the process of modeling the information system three subsystem units have been set apart: protection of archive materials at the site of the holders, compiling and processing archive materials and protection of archive materials at the Archives (repository) with expressed subsystem interactions. All data and material flows in the system have been resolved by using the object methodology in the process of system modeling. The application of multi-attribute indexing in the relational tables made automatic generation and updating possible for a whole set of reviews, files and reports, which facilitates the manual part of work to a large extent.

Conform to Yourdon's approach for object oriented analysis (OOA) and object oriented modeling (OOM), an object model of the Archives of Macedonia was cre-

ated (see Figure 2). Four classes of objects have been defined: users, archive materi-
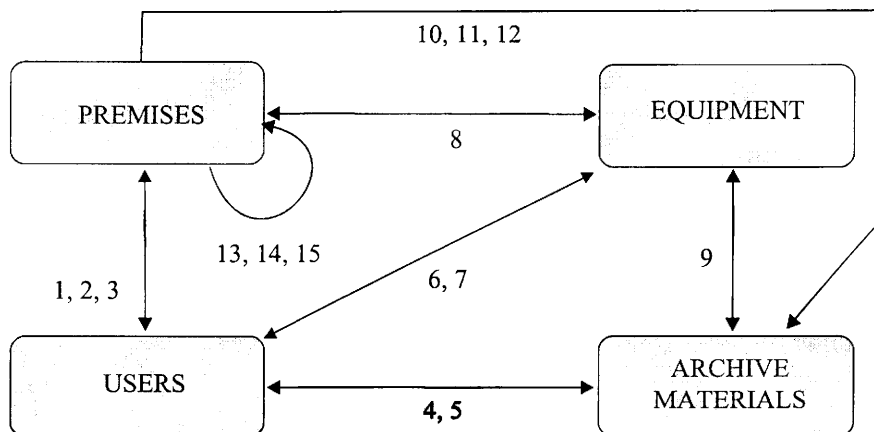al, equipment and premises.

Figure 2. Object model of the Archives of Macedonia

The established functional links between individual classes are:

1. Authorized user access to a building

2. Authorized user access to premises

3. Exit of a user from the building

4. Picking up archive materials
5. Returning archive materials
6. Entry into the information system
7. Authorized copying
8. Authorized removal of equipment
   from the premises and building

9. Access to memorized archive
   materials through equipment
10. Removing archive materials
    from the premises
11. Removing archive materials
    from the building

12. Evacuation of archive materials
13. Protection from burglary
14. Protection from flood

– *Class of users* – System users are all persons who use the archive materials.
Notwithstanding good wishes, the system must be organized to protect against ille-
gal user activities. Illegal user activities here means all activities in the system which

fall outside the approved level of physical access to the premises or in the information access to the databases.

– *Class of archive materials* – This class includes all original documents that are kept permanently in the repositories, photocopies, microfilms, microfiches, documents that are appropriately memorized in the computer system, and all other forms of preserving data of interest to archive work. The proper categorization of the level of access to the archive materials is of essential importance for efficient operation of the system, and its abuse may have unforeseen consequences.

The user gets information about the existence of a document *if and only if* his access category is higher than the one of the document.

– *Class of equipment* – This class includes all valuable equipment in the premises of the Archives. The accent is upon computer equipment, printers, scanners, etc. Since this concerns equipment that works within a network, the problem of protection is reduced to holding equipment within specific premises. Just like with the archive materials, a tagging system will be used (C.J. Revell – 95), enabling that equipment can be used in one room while its unauthorized removal will automatically activate the alarm.

– *Class of premises* – This class includes all premises of the Archives of Macedonia which are of interest for the system. The protection of these premises supposes:

– protection against fire;
– protection against flooding;
– protection against burglary;
– movement detection.

3.1. SYSTEM ARCHITECTURE

In selecting the hardware platform of the information system of the Archives of Macedonia, the approach was adopted of creating a distributed database in accordance with the client-server methodology, by means of a network of personal computers. In support to the choice of this methodology is the fact that all renown PC manufacturers are offering specially designed PC network servers who with their power are already close to the mini-computers, offering an incomparably larger structural flexibility. At present, a computer network is installed at the Archives of Macedonia, which consists of one server and 10 clients with the following performances: Server: IBM PC Server 310, with 32 Mb RAM and 2.0 Gb HDD; Clients: IBM PC 100, with 16 Mb RAM and 1.3 Gb HDD.

Because of the need for a multi-user and multitasking operating system, the Microsoft Windows NT operating system was chosen for the following reasons:

74

- The operating system includes support to a large number of different clients, start-
  ing with its Windows NT Client, through Windows 3.x, Windows for Workgro-
  ups 3.11, Windows 95, UNIX OS/s, Apple Mackintosh, and all up to MS-DOS
  clients.
- Windows NT comes with support for almost all modern networks: AppleTalk,
  Novell NetWare, Sun NFS-PCNFS, DEC PATHWORKS, IBM LAN Server, Mi-
  crosoft LAN Manager, Microsoft Windows for Workgroups, RAS (Remote
  Access Service), through ISDN, X.25 and standard telephone lines, etc.
- In compliance with the above, Windows NT has support for the following proto-
  cols: NetBEUI, IPX/SPX, TCP/IP, AFP, DLC.
- Windows NT contains drivers for all kinds of Ethernet, for FDDI, and it also has a
  whole range of drivers for all possible kinds of peripheral devices: printers, mo-
  dems, CD ROM, etc.
- Windows NT is produced also for platforms that are not based on Intel processors,
  i.e. for platforms based on Alpha and MIPS processors, and it is also designed for
  operation with multiprocessor platforms.
- Windows NT contains the following built-in protection: RAID 5, C2, disk mirror-
  ing, support to uninterrupted power supplies (UPS), and support for recording va-
  rious tape formats(streamer, DAT, etc.).

It is natural that the Microsoft SQL Server becomes the database for the Win-
dows NT operating system. The SQL server is a relatively new database developed
by Microsoft in cooperation with Sybase. It is specially designed for working with
Windows NT and it uses all its characteristics, which gives it an advantage over ot-
her databases which have their own versions of Windows NT. The development of
client applications in a graphics environment may be implemented with any Micro-
soft development tool: Access, Visual Basic, Visual C++ or Visual FoxPro.

Visual FoxPro was used for developing applications.

3.2. SUBSYSTEM: PROTECTION OF ARCHIVE MATERIALS AT
HOLDER'S SITE AND INSPECTION SUPERVISION

The basic characteristic of this subsystem is that it fully respects the protection
of archive materials at the site of the holder, through all processes of working with it,
as well as the legal obligations of the holders towards the Archives of Macedonia.
The subsystem consists of 9 applications:

Documentation on holders (registration) – By entering data for each holder,
its code is appointed automatically, i.e. the serial number in the basic documentati-
on. Besides the basic data on the holder, short descriptions of the holder's activity
and history are entered, and then its priority is determined.

Decisions on working with holders – For every employee in the Sector for inspection supervision and protection of archive material at the holder's site, two decisions are prepared: 1. Decision on appointing a holder, and 2. Decision on annual visits to the holders. Based upon these decisions, the employee attains an absolute access to the holders who are allocated to him with the decision (No. 1).

Submitted by-laws from holders – For every holder, normative by-laws of the holder and submitted decisions on the establishing of committees at the holder are entered, forming an integral part of the holder's file.

Visits – The visits are divided into 3 categories: regular, control and advisory. Regardless of the category of the visit, the responsible officer makes a protocol about the visit in all cases. After entering the notification for the visit to the specific holder, the responsible officer prepares a protocol from the visit with the determined situation and the deadlines that were given. These inspections enable a monitoring of the given deadlines for correction of the determined defects.

Destruction – By entering received requests for destruction of documentary materials with expired storage deadlines from the specific holder, the responsible officer has an overview of all received requests for approval for the destruction of documentary material, and after the documentary material is reviewed, an approval is prepared for its destruction. The reviews make it possible to prepare a summary of destroyed documentary material per holder for every year. Furthermore, the review of the specific holder provides data about how much and when worthless documentary material was destroyed, according to the issued approvals.

Plans for archival marks and lists – The received plans and lists are entered automatically for each holder in the general part. Changes and supplements to the plans and lists (especially in the separate part) are entered depending upon the organization. By issuing an approval for their implementation, reviews can be made of received plans and lists for the specific year, and a review of received plans and lists for a specific holder.

Descriptions and inventories of archive materials – The descriptions and inventories of archive materials for every holder must be entered by the direct operators. This facilitates to a large extent the admittance of archive materials and comparison of descriptions and inventories per specific holder, year and admitted archive materials. The reviews make it possible to get insight into the received inventories for every year, while the review per holder enables insight into all received inventories.

Admittance of archive materials to the Archives – Committee admittance of archive materials from a specific holder, after the final protocol is made, means automatic transfer of all entered data into a specific fond at the repository or its documentation as a new fond. Thus, this system is connected to the DEPO subsystem.

Inspection control – Two types of inspection control are defined: regular and control inspection. The application is intended exclusively for inspectors, where after the notification and the visit to the specific holder, a protocol is prepared by the inspection control with the determined situation and the deadlines that were given, with precisely defined date of execution. Inspection control visits and the written announcements after the inspection report refer to the already entered data at the holder. These reviews enable monitoring of given deadlines.

The subsystem contains a log file for access control to the application, in order to avoid abuse. Within the log file for each user, a unique set of applications is allocated to which he has access.

Based upon the specific decision for work with the holder, the officer receives all previously entered data about the holder. From the moment he receives the decision, the officer has absolute access priority for that holder. The holder is closed for access for the other officers, except for the head of the Department and the deputy director of the Sector.

After the operation of the holder terminates, in order to cancel him and to take over the archive materials, and after the admittance committee finishes its review and makes a decision on the admittance, the admittance protocol is activated, thereby transferring all entered data to the repository. After the fond is admitted to the repository, the officer can no longer make corrections to the entered data.

3.3. SUBSYSTEM: COMPILING AND PROCESSING ARCHIVE MATERIALS AND PREPARING SCIENTIFIC-INFORMATION MEANS

The subsystem for compiling and processing archive materials is configured according to the natural sequence of work in compiling and processing the archive materials, with a consistent reflection of the whole work process. Thus, a decision is first prepared for each officer for compiling or processing a fond, with a description of work operations, planned time for working on the fond, and the planned information aids which need to be prepared.

From the moment of receiving the decision, the officer has absolute access priority to the fond. The officer receives all previously entered data about the fond, which he changes and supplements during his work.

The fond is closed for access by the other officers until the moment the completed fond is entered into the repository.

The subsystem consists of seven applications:

Fond compilation – By receiving the decision for compiling a fond/ collection, the direct operator attains all privileges for working with the specific fond. He receives all previously entered data, which he changes and supplements. A descrip-

77

tion is prepared of the archive books, a summary inventory, i.e. technical processing of microfilmed materials. Within the framework of the fond, numbers are generated for the archive books and boxes. Thereby a short description is prepared of the contents of the fond and of the creator of the fond.

Fond processing – For processing the fond/collection, the decision also specifies the information means which needs to be prepared: an analytic inventory or e regest. The serial number of the archive unit from the archive box is generated automatically.

Compilation and processing reports – The application is intended for the heads of the Compilation and Processing Sector, for facilitating the monitoring of decisions for compiling, respectively processing, of the fond, of the deadlines for completing work based on the norms and standards for working with a fond, and the direct performing of the appointed tasks.

Receipts – In compliance with present practice, two types of receipts are defined: for taking over and returning archive materials. After receiving the decision, the officer fills in a receipt for taking over archive materials, with an inventory of work operations, quantity and border years. The receipt is transferred to the manager for confirmation, and after this to the repository for execution.

Worthless documentary materials – The selected documentary material is inventoried and destruction is suggested. Upon the proposal from the committee for issuing approvals for destruction, the data is transferred to the repository to be taken over and destroyed.

Protocol on admitting a compiled/processed fond – After the planned work on the material is finished, it is admitted to the repository by a committee. As part of this application there is a men with an inventory (with signatures) of damaged archive materials which are proposed for treatment.

When the fond is admitted to the repository, the archive officer loses all his privileges, and all entered data are taken over automatically. After the fond is admitted to the repository, the officer can no longer make any corrections to the entered data until the moment a new decision is made for higher stages of work or for supplementing with newly arrived materials.

Fond and inter-fond searches in archive materials – Within the application a set of key words (sentences) is defined, with logical AND and OR search functions. The possibility exists to search per specific fond and within the framework of the complete database.

ПРЕБАРУВАЊЕ

Скопје

Седница

⊙ По аналитичен инвентар
○ По регести

Забелешки

Фонд:	Кутија:	Архивска единица:
010158	0101	0019
010158	0102	0020
011012	0003	0032
010158	0101	0021

○ По сите зборови
⊙ Поединечно

Најдени се: 434 записи.

Име на фондот:

Собрание на Република Македонија

Излез

Содржина:

ПРВА СЕДНИЦА НА ПРЕТСЕДАТЕЛСТВОТО НА ПРЕЗИДИУМОТ НА НАРОДНОТО
СОБРАНИЕ НА НРМ , ОДРЖАНА НА 2 ЈАНУАРИ 1948 ГОДИНА

ПОКАНА на членовите на Претседателството на Президиумот на Народното
Собрание на НРМ да присуствуваат на Првата седница закажана на 2 јануари
1948 година -- н.

ЗАПИСНИК бр. 1 од Првата седница на Претседателството на Народното Собрание
на НРМ , оджана на 2 јануари 1948 година -- 1 л.
-- Пропратно писмо -- 1 л.

Printing is done as an individual summary inventory for each archive box, and
collectively for the whole fond, if the fonds ends with stage V, i.e. the printing of the
covers of the analytical inventories and regests separately (covers) for each descri-
bed unit, and collectively for the whole box, if the fond is being processed. Also after
the compilation stage and the processing stage, when a short contents at the level of
the whole fond and a short history of the creator of the fond are prepared, collective
data are generated automatically (number of books, number of archive boxes, archi-
ve units and pages).

3.4. SUBSYSTEM DEPO

Register of fonds: Besides the registration of fonds, transfer protocols are pre-
pared on all grounds for admittance of the archive materials: regular admittance,
purchase, gift or research. Within this composition is also the admittance of archive
materials from compilation and processing. The fonds are classified according acti-
vity (applied in the Guide for Archive Fonds and Collections). Then follows locati-

79

on of the archive materials. All previously entered data about the fond are taken over
(border years of the creator of the fond, border years of the materials, and quantity
expressed in the form of archive books and boxes, respectively microfilms).

Deposit – This concerns the admittance, documentation and location of the de-
posited archive materials. It covers the time of deposit and the depositor. The re-
views are prepared in this sense.

Depozit	

ДЕПОЗИТ -   **Внес на нов депозит**

Број на депозит	01-0001	Број на договор или записник	09-0078/33	Дата	06.12.1985 12:1

Назив на депозит	СОБРАНИЕ НА СРМ

Период на чување   **Количество на Граѓа**

Од	До	Должински метри	Книги	Кутии
1997	1999	37.00	0	365

Сопственик на Граѓа	СОБРАНИЕ НА РЕПУБЛИКА МАКЕДОНИЈА

Предавач на Граѓа	СОБРАНИЕ НА РМ

Седиште на творецот	СКОПЈЕ

Граничои години на Граѓа	Од	1978	До	1984

Содржина на депозит	Забелешка
Матерјали од седниците на соборите на собранието на СРМ - собор за здружен труд, собор на општините и општествено-политички собор.	До предавањето на трајно чување со документацијата целосно ќе манипулира определен работник од Собранието на Република Македонија.

Локација	ЗАПИС	СЛЕДЕН	ПРЕТХОДЕН	ИЗЛЕЗ

Fond review – Available are reviews according to register of fonds, entrance
inventory and work card of the fond/collection (where all work on a fond is listed:
admittance, compilation, processing, selection of worthless documentary material,
conservation and microfilming).

Receipts for issuing archive materials from the repository – This covers all
receipts for issuing and returning archive materials from/to the repository: for com-
pilation and processing, use, conservation and restoration and book-binding. The re-
views follow the situation with the issued archive materials.

Laboratories – After the archive materials are admitted to the laboratories for conservation and restoration and for microfilming, the applied methodology and procedure is described, as well as the deadlines that are planned for revision of the performed activities.

Requests for documentation (certificates) – Citizens that apply to the Archives with a request to receive a certificate for various needs (regulation of property-legal relations, of years of work experience, etc.) are documented, as well as the responses to the submitted requests. The reviews enable a search according to name and family name of the person submitting the request, and the date when this was submitted.

Visits to the repository – Registration of daily entry to and exit from the repository by visitors from the Archives or by external persons, with a description of the performed work, the approval for this and the time of entry and exit.

Bilateral cooperation – Signed agreements, protocols and programmes for bilateral cooperation are documented according to the time of signature and the duration of the signed agreement, as well as the obligations which arise from them.

Research in foreign institutions – Sending researchers to foreign institutions is based on signed agreements, and it covers notification and approval for the research, announced topic and approved time of stay. After the research is completed, elements from the report are entered: stay at the institution, research fonds and orders for copying archive materials. The reviews are aimed at getting insight in which countries, cities and institutions research was made, and in which fonds, as well as for which fonds orders for copying were made.

Registration and announcements of visits by foreign users to the Archives – Announced and approved user visits to the Archive and announced research topics are covered based upon the agreements for bilateral cooperation. The reviews offer insight into the announced visits according to the submitted applications, date of submittal and name and family name of the user.

Using the materials – Covers the documentation on users and archive materials: application for use, source data about the user, requested and approved archive materials for use, and copying and daily registration of users.

Publications file – This is divided into the basic kind of publications: editions, monographs and journals that are published by the Archives of Macedonia. A publication is documented from when it is planned, a contract for preparing it is signed, advance payments, providing funding, translations, reviews, printing, promotion, and all up to the documentation about responses in the daily and other press.

3.5. OTHER SUBSYSTEMS

Technical documentation – This represents a complete registration of the admittance of the technical documentation of special importance, microfilming in microfiche technology, up to the processing of the contents of the microfiches and their transfer for lasting storage in the repository. The reviews enable insight according to objects, sub-objects, with a total number of microfiches and photos.

Potential holders of archive materials – Considering that significant archive materials are located at private holders, it is foreseen to provide for them basic registration, documentation of the contents of this archive materials, the quantity, time of performed visits to the holders and protocols from the visits.

4. CONCLUSION AND FUTURE RESEARCH

This paper presents the current results from the development of the integrated information system for the Archives of Macedonia. The implementation and the preliminary results are a promising base for further development of this system.

Future development of the system will be in two directions:

1. In the theoretical field:

– Research in the application of various search algorithms by using fuzzy logic and neuron based networks. It is expected that this approach should enable a faster and more flexible data search, as well as a possibility for case-sensitive searches;

– Research in the field of multimedia systems, enabling mass processing, storage and searching of archive materials;

– Theoretical preconditions for developing an application for genealogical trees, based upon the oldest censuses of the population and source registers (of newly born, married and deceased).

2. In the application field:

– Upgrading the system with a microfilm computer port;

– Development of a computer system for scanning and searching through the especially important archive fonds and collections;

– Completion of the application of office and archive, testing, distribution to users and connection with the subsystem for external service.

– Development of an application for chronology of contemporary events.

– Preparation of a study for connection of the existing computer network with Internet and possibilities for searching and receiving documents through Internet.

– Preparation of a study on CD-ROM for the Archives of Macedonia.

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Sažetak

INTEGRIRANI INFORMACIJSKI SUSTAV ARHIVA MAKEDONIJE

U članku je opisan razvoj i arhitektura integriranog informacijskog sustava Arhiva Makedonije. Sustav je oblikovan prema Yourdonovu *Object Oriented Approach* – OOA i *client-server* metodologij, tako da omogući obuhvat i integraciju poslovnih procesa arhiva, racionalizaciju radnih postupaka i osigura računalno podržanu primjenu standardiziranih postupaka na području zaštite, prikupljanja, obrade i korištenja arhivskog gradiva.

Objektno orijentirani model arhiva čine četiri klase objekata: korisnici, arhivsko gradivo, oprema i prostor. Struktura i funkcionalne značajke informacijskog sustava određeni su svojstvima, pravilima interakcije i ponašanja objekata četiriju klasa u sustavu. Svojstvima objekata klase korisnika određena su prava korištenja i pristupa informacijskim resursima te provedena zaštita od neovlaštenog pristupa. Klasa arhivskog gradiva obuhvaća sav izvorni i reproducirani materijal kroz njegovu reprezentaciju u sustavu i nadzor nad rukovanjem fizičkim entitetima. Klase opreme i prostora određuju sredstva i okolinu zaštite i obrade gradiva.

Sustav je oblikovan u nekoliko funkcionalno povezanih podsustava. Podsustav "Zaštita arhivskog gradiva imatelja i inspekcijski nadzor" obuhvaća sve aktivnosti koje se odnose na zaštitu gradiva kod imatelja izvan arhiva. Sastoji se od devet aplikacija: 1. dokumentacija o imateljima; 2. rješenja za rad s imateljem (rješenje o dodjeli odgovornosti i rješenje o godišnjim nadzornim obilascima); 3. normativni dokumenti imatelja; 4. obilasci (redovni, kontrolni, savjetodavni), s planovima i izvješćima o obilasku; 5. izlučivanje gradiva kod imatelja; 6. planovi i liste; 7. popisi arhivskog gradiva kod imatelja; 8. preuzimanje gradiva u arhiv; 9. inspekcijski nadzor. Podsistem sadrži log datoteku radi nadzora pristupa aplikacijama. Po završetku procesa u okviru ovog podsustava, svi se relevantni podaci unose u podsustav spremišta.

Podsustav "Spremište" obuhvaća: registar fondova (gradivo preuzeto po službenoj dužnosti, otkupom ili kao poklon), evidenciju depozita; pregled podataka o fondovima prema registru, ulaznom inventaru i radnim kartonima; izdavanje gradi-

85

va i povrat u spremište; restauriranje i mikrofilmiranje; zahtjevi za izdavanje doku-
mentacije; evidencija ulazaka u spremište; bilateralna suradnja; istraživanje u ino-
zemstvu; registracija stranih korisnika; korištenje gradiva (dokumentacija o korisni-
cima, zahtjevima za korištenje, korištenom i kopiranom gradivu); evidencija publi-
kacija.

Podsustav "Sređivanje i obrada arhivskog gradiva i izrada obavijesnih poma-
gala" oblikovan je prema tijeku radnog procesa na obradi gradiva, uključujući plani-
ranje i nadzor rada na obradi. Podsustav preuzima relevantne podatke nastale u rani-
jim fazama rada. Sastoji se od sedam aplikacija: 1. sređivanje (izrada sumarnog opi-
sa i označavanje jedinica); 2. obrada fonda (izrada analitičkog inventara ili regesta);
3. izvješća o sređivanju i obradi; 4. izdavanje i povrat gradiva u spremište; 5. bezvri-
jedan dokumentacijski materijal (prijedlog za izlučivanje); 6. zapisnik o predaji
obrađenog gradiva (s prijedlogom gradiva za restauriranje); 7. pretraživanje. Po
završetku rada na sređivanju i obradi podaci se prenose u evidenciju spremišta i nisu
podložni mijenjanju. Podsustav omogućuje ispis različitih oblika inventara, oznaka
tehničkih jedinica i izvješća.

Pored ova tri osnovna podsustava postoji i podsustav za obradu tehničke doku-
mentacije u kojem se obrađuje tehnička dokumentacija o svim važnijim objektima,
uključujući i obradu mikrofilmova i mikrofiševa tog gradiva, te podsustav "Potenci-
jalni imatelji arhivskog gradiva" u kojem se evidentiraju podaci o mogućim imate-
ljima koji nisu u sustavu nadzora nad imateljima za koje je arhiv trenutno nadležan,
te podaci o gradivu kod tih imatelja.

Uz ovdje opisan sustav postoje i podsustavi za automatsku regulaciju mikrokli-
me u spremištima, zaštitu od požara, provale i video-nadzor. U skladu s objektno
orijentiranim modelom arhiva, ova četiri podsustava upravljaju objektima klase pro-
stora te će biti integrirani u jedinstveni sustav.