

**PLAN TO IMPROVE  
MUNICIPAL COMPUTER  
SYSTEMS CAPABILITIES**

**MUNICIPALITY OF  
BLAGOEVGRAD, BULGARIA**

Prepared for

East European Regional Housing Sector  
Assistance Project  
Project 180-0034  
U.S. Agency for International Development,  
ENI/EEUD/UDH  
Contract No. EPE-C-00-95-001100-00, RFS No.  
207



Prepared by

Tassos Belessis

B. Yordanov  
MTK Konsult  
Sofia, Bulgaria

under subcontract to

The Urban Institute



**THE URBAN INSTITUTE**

2100 M Street, NW  
Washington, DC 20037  
(202) 833-7200  
[www.urban.org](http://www.urban.org)

July 1997  
UI Project 06610-207



## TABLE OF CONTENTS

INTRODUCTION .....	1
INFORMATION SYSTEMS CAPABILITIES .....	2
Hardware, Operating Systems and Communications .....	2
Software (Commercial and Custom-Made) .....	5
System Administration Procedures .....	9



# **PLAN TO IMPROVE MUNICIPAL COMPUTER SYSTEMS CAPABILITIES**

## **MUNICIPALITY OF BLAGOEVGRAD, BULGARIA**

### **INTRODUCTION**

The Municipality of Blagoevgrad is one of ten pilot municipalities involved in USAID's Local Government Initiative (LGI). The overall objective of the program in Blagoevgrad is to provide technical assistance and training on a variety of levels in order to aid the municipality in refining the level of services provided to its citizens. Four projects have been identified to improve the delivery of urban services. These are:

- Project 1: Improving the Municipal Information Systems
- Project 2: Streamlining the Issuance of Real Property Permits
- Project 3: Improving Sanitation Services Delivery
- Project 4: Improving Transportation Services Delivery

The specific objective of Project 1 is to improve and strengthen the information systems that support municipal functions and operations. The project has been divided into three phases:

- I On-site Assessment
- II Developing Hardware and Software Inventory and Preparing Information Data Flows
- III Developing Information Systems Master Plan

The purpose of this interim report is to document the work performed in the Municipality of Blagoevgrad during Phase II of Project 1 of the LGI program. The following were the specific objectives to be accomplished by the consulting groups during the second phase:

- ! To perform a complete assessment of existing hardware, system and application software, and system administration procedures (section 2).
- ! To assess the capabilities of the municipal staff in developing, using, operating, supporting, maintaining and managing computerized information systems (section 3).
- ! To look at the critical data processing areas, define an overall municipal data model, and determine areas for potential computerization and/or improvements (section 4).





- ! To prepare the specifications of computer hardware to be acquired within the terms and conditions of the Small Grant Program. This equipment aims to reconcile the needs as perceived by the municipality with the recommendations of the consultants, within the framework of the Master Information Systems Plan (Section 5).

## **INFORMATION SYSTEMS CAPABILITIES**

The brief initial assessment of the information systems and data-processing capabilities in the municipality of Blagoevgrad during Phase I of Project 1 provided the following findings:

- ! The municipality has been using computer systems for several years.
- ! For a Bulgarian organization of this size and capability the level of computerization is fair; nevertheless, the computer hardware is old and does not meet functional requirements.
- ! Many municipal functions that require data processing are performed using computers.
- ! Other governing bodies provide most of Blagoevgrad's application software.
- ! The level of functionality of these application software programs is very limited.

All these findings were confirmed during this second phase of the project. The following sections contain a complete review of the information systems and technological capabilities of the municipality of Blagoevgrad.

### ***Hardware, Operating Systems and Communications***

The Municipality of Blagoevgrad has a total of thirty five personal computers (PCS), including the server for the Local Area Network (LAN). Twenty five of these computers are attached to the LAN and the rest are stand-alone machines. Computers attached to the LAN are configured both with and without a hard disk drive. In order to achieve maximum efficiency out of the MIS system the following is recommended:

*A set of operational standards to be enforced by municipal management should be laid out for all employees throughout the municipality. Six months*

*after implementation the management, along with the Data Processing Department, should assess the execution of these regulations and implement any necessary changes or improvements.*

### **Operating System**

After examining the current Intranet-working and Internet-working features and market-driven needs, a plan to improve the IT capability of the municipality will be created. The proposed plan should focus on the Municipal IT Department's ability to take full advantage of any networking scheme and its ability to implement a set of administrative procedures and controls that will ease the transition to a secure and effective Municipal MIS. Below are several essential steps in the process:

- ! Upgrade the network operating system to the newest version (Novell IntranetWare) and upgrade all DOS-based workstations to Windows 95.
- ! Upgrade the current file server to a Pentium 166 and install a separate server for the GIS (Geographic Information System) function in order to facilitate permit issuance service delivery and other GIS-based services.
- ! Improve system administration by re-organizing the server file structure and exploiting all related features of the new network operating system. The Municipal IT Department will be able to develop and reconfigure existing file structure to enable more effective use of shared disk resources and applications.
- ! Take full advantage of the newly installed network operating system by installing Novell Directory Services, which enables users to manage a network easily and allows administrators to maintain sophisticated access controls for all the resources on the network.

### **Communications**

Intranet communication is currently available through the internal e-mail utility Pegasus Mail. This is a DOS based e-mail software application available to everyone attached to the network. Presently, external data communication capabilities and Internet access are available through dial-up with two modems and regular telephone lines. SPRY Mail and Mosaic have been installed only in the IT department and allow for regular communication with other computer centers, including the LGI in Sofia and the American



University at Blagoevgrad. This facility allows for file transfer and electronic mail exchange. The municipality can further improve communication by taking the following steps:

- ! Assess the current networking hardware and upgrade it in order to support 100mbps speed. For external connections a switching/routing device should be purchased. The device should have at least two Wide Area Network (WAN) ports, and be able to handle speeds of up to 2MBps and support all major protocols (Frame Relay, PPP, IPX, TCP/IP, Ethernet, ATM, X.25, etc.).
- ! Create a World Wide Web (WWW) publishing infrastructure and connect the server to an ISP (Internet Service Provider) via a leased line. In the future the municipality will be able to publish its own home page on the Internet. The LGI Internet project will provide assistance in setting up a home page and collecting and organizing the information to be included in the municipal WWW server.
- ! Create an e-mail system available to all network users. The messaging system can be monitored centrally by the IT Administrator. A log file containing detailed information on all e-mail traffic should also be maintained.
- ! Survey the software and networking hardware configuration of all external sites that the Municipal MIS will connect to in order to facilitate the connection. The Notary Office, the Police Department, hospitals and schools should be among the first external sites to be connected to the municipal MIS.

### **Hardware**

The majority of computer equipment in the municipality is currently highly concentrated in the administrative areas. Out of thirty five computers, eighteen are in the General Administration offices, four are in the accounting department, and four in the offices of the Mayor and his staff. The Economic Affairs Division has seven computers, while the Construction and Community Affairs Divisions have only one computer each. Following are suggestions for evening the distribution:

- ! Install new computers in departments where there is a need for additional usage. The minimum configuration should be as follows:

Processor	<ul style="list-style-type: none"> <li>• Intel Pentium CPU equivalent, minimum of 120 MHZ speed</li> <li>• ISA/PCI SCSI Bus Architecture</li> </ul>
Memory	<ul style="list-style-type: none"> <li>• 16 MB of RAM installed with expansion up to 32 MB</li> <li>• 256 KB Cache Memory</li> <li>• 840 MB SCSI Hard Disk Drive</li> <li>• 1.44 MB 3.5 inch Floppy Disk Drive</li> </ul>
Screen and Graphics	<ul style="list-style-type: none"> <li>• SVGA 14 inch color monitor .28 dpi as minimum</li> <li>• 1 MB Video RAM</li> <li>• Super VGA video adapter</li> </ul>
Keyboard and Mouse	<ul style="list-style-type: none"> <li>• 101-104 keys Latin/Cyrillic Keyboard</li> <li>• 3 buttons Microsoft compatible Mouse</li> </ul>
Networking	<ul style="list-style-type: none"> <li>• 16 bit 3COM Ethernet Combo Card Controller</li> </ul>
Operating System	<ul style="list-style-type: none"> <li>• Windows 95</li> </ul>

- ! Connect all available computers in the municipality to the LAN.
- ! Increase the total number of workstations and increase usage of existing workstations.
- ! Connect all workstations to the Local Area Network (LAN) even if their current function is stand-alone.
- ! Expand the current wiring of the municipality by replacing all coaxial cables with advanced structured cabling system category-5. Data outlets should be installed in every room, even in the rooms where there are presently no workstations. This will facilitate future development.
- ! Upgrade existing computers by increasing their Random Access Memory (RAM) to a minimum of 8MB and their processor speed to at least 486.

### ***Software (Commercial and Custom-Made)***

#### **Commercial Software**

A number of PC general software applications are available for most users in the municipal government. These applications include word-processing programs, spreadsheets, electronic mail, and graphics. The following table is a list of all the general applications currently in use.



**Table 1**  
**System and Package Software Available in the Municipality**

Type of Software	Manufacturer	Operating System	NW	Manuals
Word 5.0	Microsoft	DOS 6.2	Yes	Yes
WinWord 2.0	Microsoft	Windows 3.1	No	Yes
WinExcel 4.0	Microsoft	Windows 3.1	No	Yes
Microsoft Office 4.2	Microsoft	Windows 3.1	No	Yes
CorelDraw 5.0	CorelDraw	Windows 3.1	No	Yes
PE 3	NA	DOS 3.30	No	Yes
PE 2	NA	DOS 3.30	No	No
Diction	NA	DOS 6.2	Yes	No
Prosoft Text	Prosoft Ltd.	DOS 6.2	Yes	No
Spry Mail	NA	Windows 3.1	No	Yes
Pegasus Mail	NA	DOS 6.2	Yes	No

In order to modernize the system, it is suggested to:

- ! Upgrade all commercial and custom-made software programs to the most recent versions.
- ! Upgrade all stand-alone software to its network-based version (if available).
- ! Upgrade all DOS based software to its Windows equivalent (if available), to benefit from improved user interface and the advantages of Windows.

### **Application Software**

The application software available covers a wide variety of the municipal functions. For example, the Payroll Department uses TRZ, Civil Registration uses ESGRAON and Legal Database uses APIS. Many of these existing software applications were given to the municipality by external central government organizations, such as the Ministry of Finance, which provided SOMB for budget execution, or the Ministry of Regional Development and Construction, which provided ESGRAON for Civil Registration. The municipality has acquired some programs from local

vendors such as Soft Informatika, which provided DELOVODSTVO for the Documentation Tracking System Department.

All available software applications are character-based and run on DOS operating systems. They have been developed using a variety of languages and tools, including dBase, Clipper, and Btrieve. The following table is a list of all the application software programs available in the municipality.

**Table 2**  
**Application Software**

Name	Main Function	Operating System	Network Ready	Developer	Source Code
ACCOUNTING AND FINANCE					
BDJ	Budget preparation system	DOS 6.2	No	IT Center MOF	No
SOMB	Budget consolidation system	DOS 6.2	No	IT Center MOF	No
FSD	Accounting system	DOS 6.2	No	IT Center MOF	No



**Table 2**  
**Application Software (Continued)**

Name	Main Function	Operating System	Network Ready	Developer	Source Code
ADMINISTRATION					
ESGRAON	Civil registration system	DOS 6.2	Yes	Central Institute for Programming Products and Systems	No
KADRI	Human resources system	DOS 6.2	Yes	IT Center MOF	No
TRZ	Payroll system	DOS 6.2	No	IT Center MOF	No
Delovodstvo	Documentation tracking system	DOS 6.2	Yes	Soft Informatika	No
Storage	Storage management system	DOS 6.2	Yes	Dplus	Yes
CONSTRUCTION					
ACT 19	Construction cost system	DOS 3.30	No	NA	No
ACTI	Construction evaluation system	DOS 3.30	No	NA	No
ACSTER - M	Graphical Information System (GIS) and Cadaster	DOS 6.2	No	Technical University - Computer Laboratory - Acstrer	No
ECONOMIC AFFAIRS					
BTO	Temporary trade contracts	DOS 6.2	No	ITM - Rouse	No
OI	Municipal properties rental contracts	DOS 6.2	No	ITM - Rouse	No
DIMOT	Creating acts for municipal estates	DOS 6.2	No	Central Institute for Programming Products and Systems	No
NAEMI	Municipal housing rental collection	DOS 6.2	No	Local developer	No
GIL	Control of lodging ownership for single families	DOS 6.2	No	self developed	Yes
JVSS	Housing savings bank information system	DOS 6.2	No	SoftInformatika	No

---

APIS	Legal information repository	DOS 6.2	Yes	“Apis” Ltd.	Yes
------	------------------------------	---------	-----	-------------	-----

---

In order to make these programs more useful to the municipality, it will be necessary to:

- ! Obtain network versions of the products, where necessary.
- ! Upgrade the current versions with newer versions, Windows-based if possible.
- ! In those areas where the municipality has the flexibility and finances to change or replace software applications, it should replace existing software with the better applications available in the market today.

### **Evaluation**

There are important differences in the quality and functionality of the software applications currently available. However, a common denominator is that all of the applications are DOS-character based. Also, most of the applications are for single users, which make them unsuitable for use in a network environment.

A detailed and complete analysis and evaluation of each individual program would be required to determine the specific features of the applications and to make specific recommendations for improvement. This type of analysis is out of the scope of this general assessment. However, even a quick overview of many of the applications currently available proved that systems that are poorly designed and provide very limited functionality. Some of these applications are no more than simple databases able to perform only basic data-entry, reporting and querying functions. One potential obstacle for change is that since the use of many of the applications provided by central government institutions is mandatory,<sup>1</sup> it is difficult to determine the flexibility of the municipality to change or replace particular applications.

Another common feature is the lack of integration of the applications and the corresponding databases, creating a high degree of data duplication. The tools (databases, languages, etc.) used to develop these applications are the most basic currently available, with very limited capabilities for future

---

<sup>1</sup> This is the case in ESGRAON, BDJ, and other software.



improvement. The development tools of choice seem to be dBase and Clipper<sup>2</sup>. The fact that source codes are not available for most of the existing applications is also a limiting factor. The municipality will be unable to maintain and improve these applications. However, there are existing upgrade versions provided by developers for most applications available in the municipality, with new functions and multi-user access. The municipality plans to obtain these versions in the near future.

It is recommended that the municipality change or replace software applications in those areas where it has the flexibility to do so. However, since the municipality does not have the technical personnel required to develop and/or implement these types of applications, upgrading these applications will require considerable external resources. One alternative is to identify suitable application software packages developed by external vendors (local or non-local), as was done for the GIS system.

### ***System Administration Procedures***

The results of our analysis indicate that the administration procedures in place are few and poorly defined. This is an important area to consider if growth and expansion are expected in terms of computer and information systems support. The following are our observations along with evaluations of some of the most critical systems administration procedures.

#### **Backup and Restore**

The hardware infrastructure does not include any backup/restore devices, and there are no special backup/restore procedures in place. Backups are performed using floppy disks (3.5" diskettes) and occur at two levels.

- ! Users are responsible for backing up files that have experienced changes during the day. This procedure is not enforced by the IS Manager.
- ! The IS Manager is responsible for backing up the entire 500 MB of data residing on the network server. These backups are also performed using 3.5" diskettes and should occur weekly. The backup diskettes are maintained in the same room where the server is located with no special controls or protection.

---

<sup>2</sup> In most cases, the municipality does have knowledge of the tools used to develop the applications.

In order to improve the current situation, it is recommended to:

- ! Use the server-based tape backup device with scheduling software for daily backup sessions of critical municipal activity data.
- ! Maintain a set of backup tapes with incremental backups and perform full monthly backups.

### **Security and Controls**

Security and control devices and procedures are limited. The network server is located in a small room that is also used as the IS Manager's office, hardware repair shop and for data-entry tasks. The room has no special environmental controls and no fire control equipment is available. Access control is implemented at the software level; users log-on to the network with user IDs and personal passwords. In order to improve this environment the following steps should be taken:

- ! Enforce security and system reliability procedures by exploiting the capabilities of the new network operating system, the newly acquired Novell network operating system supports disk and system fault tolerance (SFT).
- ! Establish and maintain tight physical and electronic security measures for accessing the file server (password protection) and the file-server room (physical security). Initiate auditing procedures and maintain a detailed system log file. The log file will not only serve as a intruder detection mechanism but will contain all information that is required for statistical analysis on traffic, file access, peak usage times, etc.

### **Installation**

The municipality has a computer room where the network server is located. The room is also used as the offices of the Network and Information System managers. The room is very small (approximately 12 square meters) and also houses computer equipment that is undergoing repairs, maintenance and configuration. A printer and an external telephone line are also available in this room. When necessary, the room is made available for a data-entry operator. Suggested changes include:

- Obtain network versions of the products, where necessary.
- Expand the server-room.



- Install air-conditioning in the server room.

### **Other Issues**

Hardware and software maintenance and support are provided mostly by the IS manager. When necessary, the IS manager acts as the contact person for maintenance and support provided by external entities, typically government agencies that provide application software used in the municipality.

The network server is protected against power outage by a small Uninterrupted Power Supply (UPS) unit, but the remaining equipment is not protected at all. It is crucial to:

- ! Purchase a UPS that will protect the servers, server peripherals, networking hardware and some of the workstations that perform critical functions.
- ! Purchase fire control equipment.