

Analysis and designing of signaling automated system during the emergencies in the water saving systems, based on GPRS service

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ABSTRACT

The paper provides analysis of different methods of signaling automated system based on different techniques of telecommunication means. Shows that most effective way is using GPRS service, and soused solution based of it, which is in realization process.

Keywords

GPRS, VHF, UHF, Mobile Territorial Distance Data Transfer Network

1. Introduction

Reservoirs matter greatly in the economy of the Republic of Armenia, which causes serious problems for the organization of their maintenance and alarming of population of water-covered area during emergencies caused by lasher crash.

Information and controlling technologies are necessary for efficient accomplishment of Emergency Action Plans (EAP) for each lasher and control center in Yerevan, as well as for information exchange with rural centers. Regional centers, on the other hand, must be connected with those villages, that can be covered by water during lasher breakdown. They should also be able to turn on remotely alarm sirens in the villages.

The problem concerns the realization of choosing the method of information transfer corresponding to given area, technical means, associated devices and providing information exchange.

Ways of signaling organization in emergencies

A similar way of service organization is shown in the outlined part of the scheme in fig. 1, where announcement of the emergency is done through phone lines that are connected with sirens through transforming launch device. These transforming devices serve for providing feedback between sirens and control centers. AP-164 type device can be given as an example.

Feedback information contains data concerning the efficiency of siren engine and presence of current.

Nowadays fixed cable phone lines in rural areas are mostly in a very bad shape, and existing transformers are to be modernized.

In not-outlined parts of Fig. 1 possible organization scheme of communication with rural areas is given using shortwave (VHF) and ultra shortwave (UHF) radio communication means.

Here research results regarding the organization of VHF and UHF communications in Armenia are reviewed. For this matter special regulations of communication in separate services are developed, according to which communication operators are changing frequencies of the radio waves, by which constant communication in VHF between the objects is provided.

While the signaling system has to function automatically and non-stop, without operator's participation, irrespective of daytime and weather, it is possible to affirm that using SW radio stations in this type of control systems is not expedient. In comparison with VHF connection UHF connection has quite stable characteristics. In the same time it has several shortcomings, which requires certain expenditure for providing the necessary network coverage. USW connection requires direct visibility and, depending on features of conductors and receivers, limited distance of connection.

To ensure necessary coverage, radio communication repeater network is to be built, which will make necessary areas accessible. Possible structure of such network resembles current TV-network in RA [1]. In order to send information to center through radio stations about the state of signaling system it is necessary to implement certain automates, which will maintain records of communication.

Using cellular communication networks

Currently GSM cellular communication networks in Trans-Armenia cover 95% of the country. GSM provides GPRS data sending service,

which facilitates alarming of emergencies in a simpler way, and in the same time organizes feedback of respective siren devices to control centers. Modern GPRS modems have IP stack, open AT – ways of program correction and secured

functions for loading certain tasks in modem flash memory. It is also possible to choose TCP or UDP working records of data transfer.

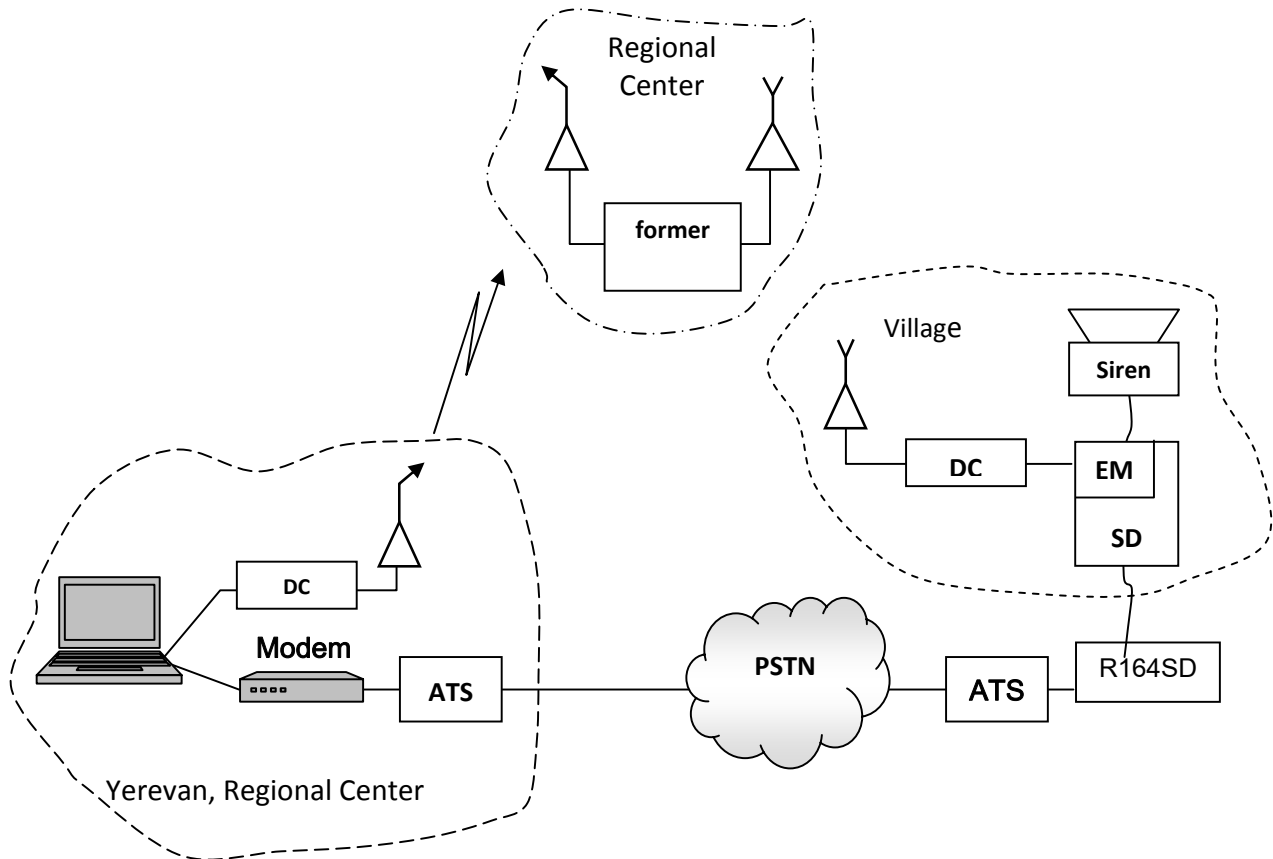


Figure 1. Scheme of communication organization with rural areas, using VHF and UHF radio communication means. TR - transformer, DC - Decoder, EM – Executing mechanism, SD - Starting device, ATS – Automat Telephone Station, PSTN – Public switch Telephone Network

There are two ways of organization of communication channels between the Controller's Office (CO) and Mobile Territorial Distance Data Transfer Network (MTDDTN).

The first and widely used one is sending of orders and data through internet, because during usual connection communication operator's server at activation of each GPRS modem assigns dynamic local IP address to it, which excludes exchange of direct data [2].

Second way is obtaining static local IP addresses through GSM connection operator for all mobile GPRS terminals and CO, and building a network, based on these addresses. The very same way is suggested for construction of distance communication surrounding, using GPRS corporate MTDDTN in RA water economy. This approach represents alternative version of corporate stringed networks, which is shown in Figure 2.

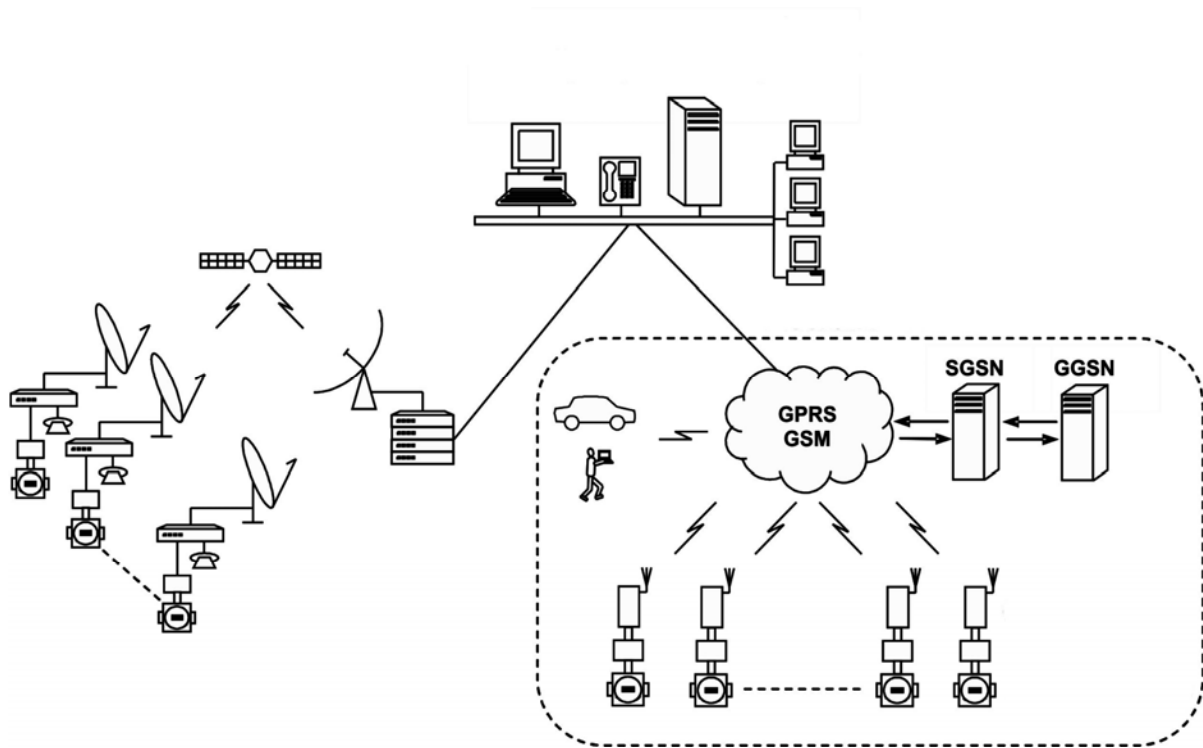


Fig. 2

Experience shows that option with static local IP addresses provides highest level of data transfer security, because

- data is going through allocated channel between the terminal model and operator's device, leaving out internet.
- local addresses are not reachable from internet, which excludes external attacks and other impacts.
- GPRS modems with allocated static local IP addresses are constantly in "virtual" connection mode, which increases efficiency of the system.

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