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THE LOCAL AND SPECIAL AUTOMATED SYSTEMS OF NOTIFICATION OF CIVIL DEFENCE

BILOUSOV S.I, MALYAVIN I.P.

Odessa National Academy of Telecommunications n. a. O.S. Popov

ЛОКАЛЬНІ ТА СПЕЦІАЛЬНІ АВТОМАТИЗОВАНІ СИСТЕМИ ОПОВІЩЕННЯ ЦИВІЛЬНОГО ЗАХИСТУ

БІЛОУСОВ С.І., МАЛЯВІН І.П.

Одеська національна академія зв'язку ім. О.С. Попова

Abstract. *The article deals with basic provisions about local and special automated systems of notification of civil defence. Principles of functioning and structural diagrams are considered.*

Анотація. *В статті розглянуто основні положення щодо локальних і спеціальних систем оповіщення цивільного захисту. Розглянуто принципи функціонування та структурні схеми цих систем.*

INTRODUCTION

According to Law of Ukraine "On protection of population and territories from emergency situations of technogenic and natural character" [1], Code of civil defence of Ukraine [2] and other normative documents [3, 4] provided timely notification and constant public information about the threat of technogenic emergencies and natural disasters it is an actual task.

Modern notification system (NS) [5, 6], data ware and software are created to perform tasks of Civil Defence based on the automated systems of centralized notification, communication networks, radio etc.

The typical general system decisions for creation of the local and special automated systems of notification (ASN) with the use of modern technical equipments and information technologies are considered.

The existing in Ukraine system of notification is created, mainly, on the base of out-of-date equipment that worked the set resource already, taken off from a production and exhausted awaiting-parts for repair. Also the schematics of existent equipment does not allow to execute modernisation with the parcel of land of it user facilities. Thus, at creation of local and special ASN possibility of connection of these systems is envisaged, as guided, to the systems of higher level by means of modern technical equipments. Such connection will come true at an input in an action of the systems of higher level, built on modern technical equipments.

MAIN PART

Local automated system of notification (LASN) is designed to:

– control of potentially dangerous object (PDO), such as the timely detection of an emergency by technical means of measuring the concentration of pollutants in the air, in certain places the facility and transfer of information about the threat of an operator;

– alert personnel of potentially hazardous objects of pre emergency (emergency) situation and alert of the population in the area of possible contamination by the use of various means of notification;

– alert officials potentially dangerous object, city (district) and forces quick response by using the communication system, which subscribers are officials;

– implementation of interoperability with other systems belonging to the unified state system of civil protection of population.

LASN should include not only potentially dangerous objects but also the territory possible defeat of the population who are the source data for the design and construction of the local system. LASN is built on a base control stand by facilities of notification (CSFN) [5, 6] using computers and terminal notification

means control units (TNMCU) [5…7]. Software of CSFN has an additional module that provides the calculation of distribution of clouds dangerous substance in operational weather information coming in an automated mode meteocomplex (Fig. 1), which is located in a potentially dangerous object.

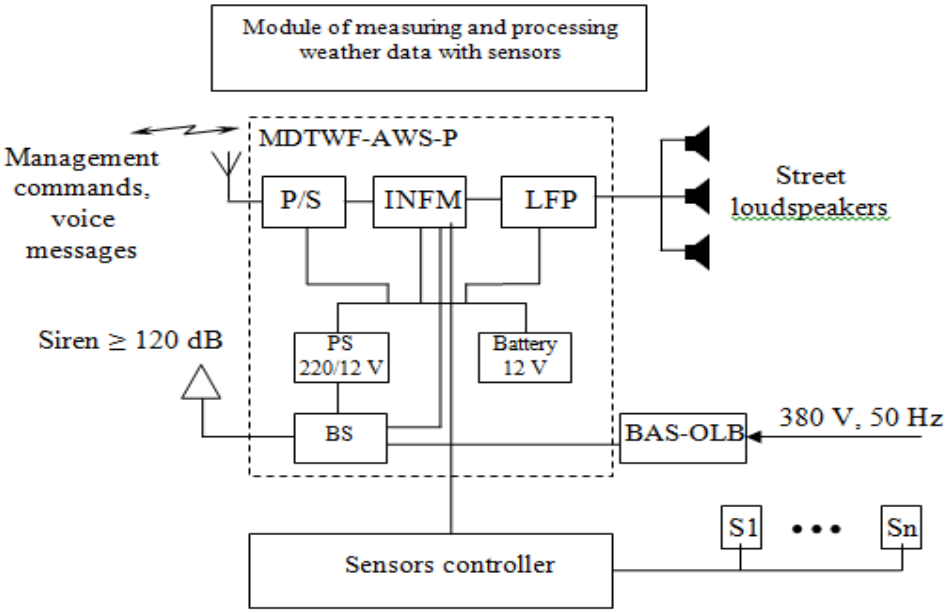

Figure 1 – Block diagram of radio-meteocomplex MCA-P

Functioning algorithm of CSFN of the local systems of notification coincides with the functioning algorithm of control stands of the regional systems in part of transmission of codes signals of common definite commands of management, and also reception of confirmations from eventual facilities of notification about implementation or not instructions execution.

Additional functions performed by requesting and receiving weather information from meteocomplex MCA-P and calculation of area distribution of dangerous clouds substance, a coming cloud to settlements within the area of injury.

Meteocomplex MCA-P (Fig. 1) consists of device processing and transmission of weather information, modulus measurements and processing weather information with a set of sensors (sensors of wind, temperature, humidity, pressure), which can connect the sensor detecting harmful substances. If necessary simultaneous of public notification functions and monitoring of the environment, is used TNMCU-MCA-P, which is based on a combination of elements TNMCU and MCA [6]. Physically meteocomplex can be located near the site of the possible release of chemical, radioactive materials in a potentially dangerous object, and has an auxiliary input to connect the controller system for controlling the potentially dangerous object and the transfer of information about the threat of an operator.

As TNMCU local systems may be used TNMCU connected with electromechanical sirens and street speakers, which in addition to playing voice messages are reproducing signal “ATTENTION ALL” with electronic sirens.

Block diagram of the LASN on based radio communication is shown in Fig. 2.

CSFN of local ASN performs the following functions:

– receiving and displaying information about the concentration of hazardous substances;

– determine and display the place of the troop landing of hazardous chemicals, radioactive substances (if there are multiple possible locations of release);

– receiving and displaying weather information from meteocomplex;

– calculation and display areas spread clouds of hazardous substances;

– alert personnel of object and the population living in the zone of possible defeat;

– remote control of TNMCU and means of notification;

– alerts officials;

– exchange of information with regional or district CSFN;
– record and save all the information in the system.

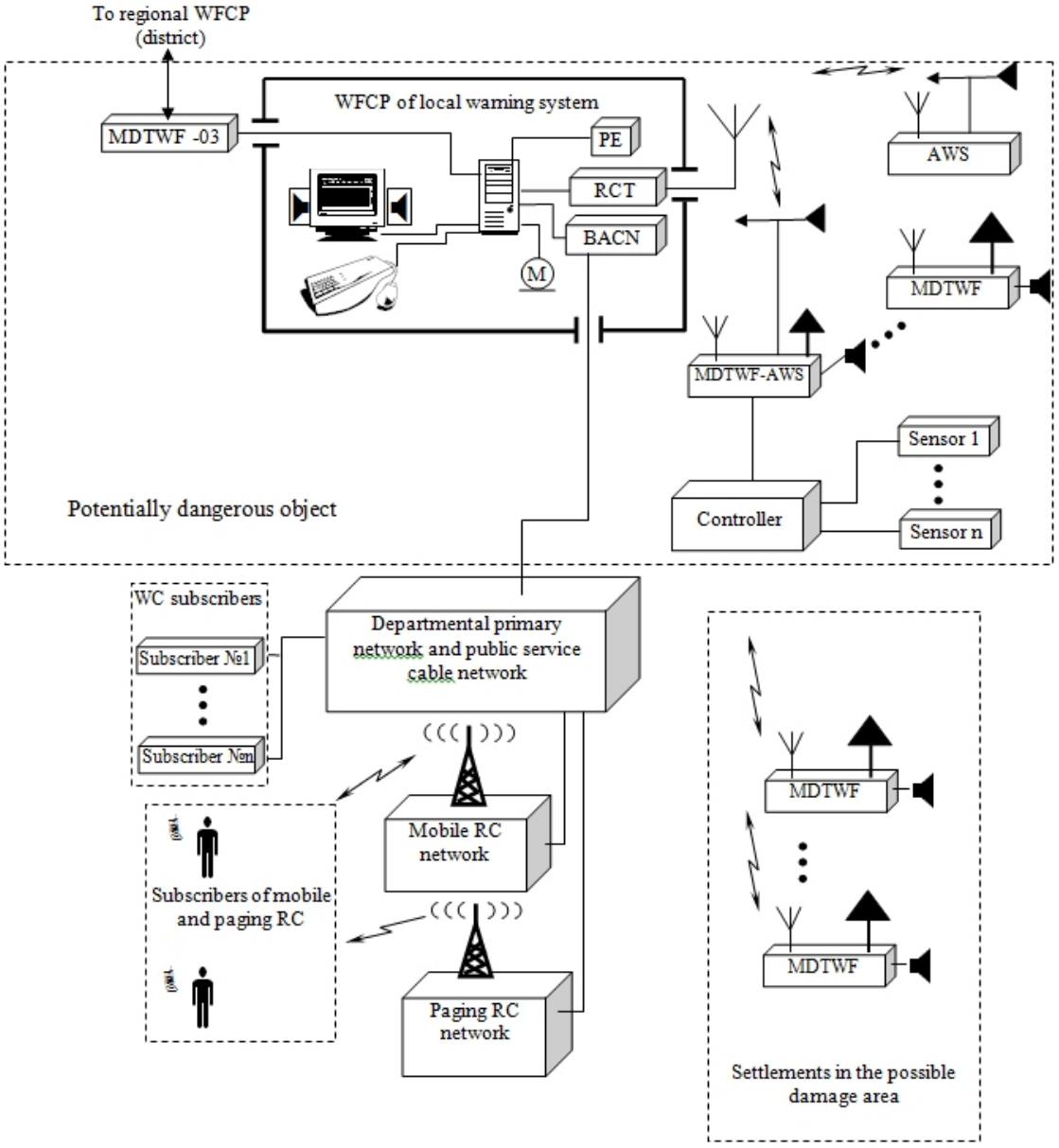

Figure 2 – Local ACO based radio communication

Special automated system of notification (SASN) is designed to perform all functions of a local system of notification for potentially dangerous pipelines, nuclear (NPS) and hydroelectric (HPS) power stations.

SASN built along the ammonia pipeline, main drainage and oil and gas pipelines, as well as areas of possible damage from accidents at NPS and HPS. They have their own specific features, such as the great length of gas, ammonia and oil pipelines, and large areas of possible defeat of the population, which is about 30 km from nuclear and hydroelectric power.

Block diagram of the SASN for nuclear power station is shown in fig. 3.

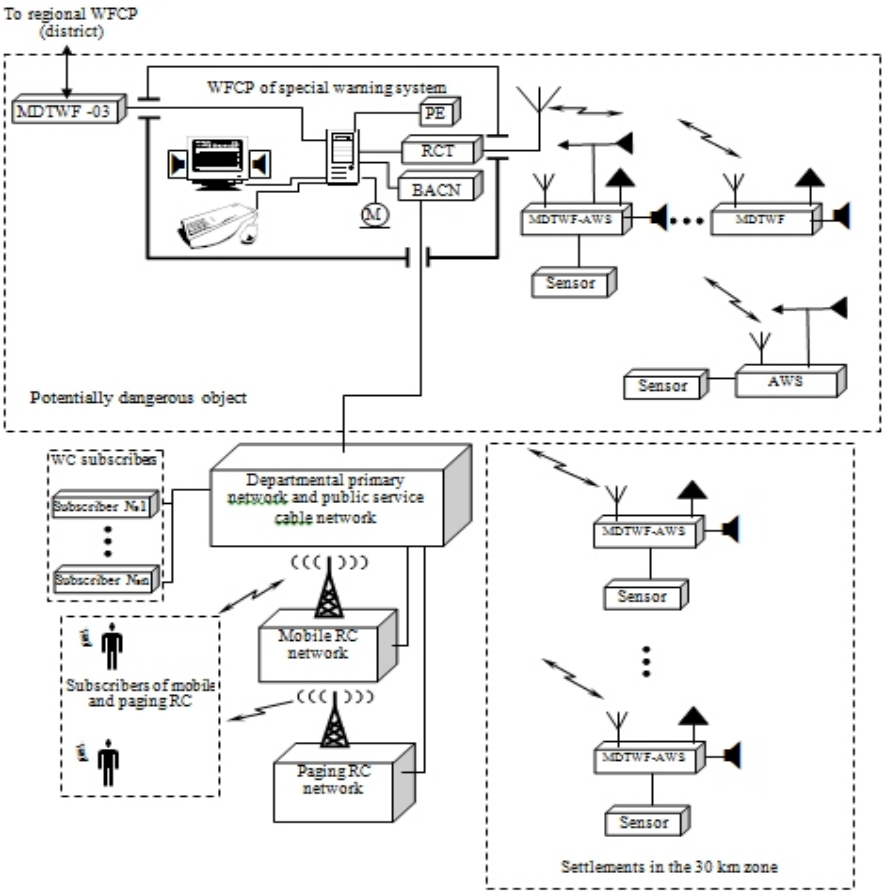

Figure 3 – Special ASN for NPS

CSFN of special ASN for NPS performs the following functions:

– receive information about the level of ionizing radiation on NPS and human settlements in the 30 km zone;

– display maps with information about the levels of ionizing radiation;

– receiving and displaying weather information from meteocomplex which is located in the NPS;

– Alerts personnel and people living in the zone of possible defeat;

– remote control of TNMCU and means of notification;

– alerts officials;

– exchange of information with regional or district CSFN;

– record and save all the information in the system.

Installing the sensor level ionizing radiation and also calculation and display areas spread radioactive cloud is an additional opportunity and is determined at the stage of designing.

CONCLUSION

It is shown as a result, that basis of means of ASN is terminal notification means control units (TNM-CU), whereby the circular or selective warning of the threat or occurrence of emergency situations.

As an alternative to the existing circular calling system, circular or selective alert officials realized on telecommunications platform and provides automated alerts using the newest information technology.

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