Building of the «Safe City» Software-Hardware Complex at the Novovoronezh Urban District in the Voronezh Region

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Abstract. The United Nations approved the development of the cities towards «Resilience-building of cities to disasters: my city is preparing» in 2010, its purpose is actively to implement for reducing the number of natural disasters measures and mitigation of catastrophes in towns. During the program time in the word 3098 cities from 119 countries from the world were participated in this program. The «All-Russian EMERCOME of Russia research institute of Civil Defense and emergency situations problems» certified 7 cities of Russia Federation in 24 Jan. 2017, which involved in the Resilience-building of cities «My city is preparing» international program. The program was carried out through the UN International Development Strategy strategies to reduce the calamities; in many ways, its main principles are interrelated with the «Safe City» software-hardware complex developed in Russian [1,2].

1. Purpose
The implementation of realization the «Safe City» software-hardware complex is adopted by the Russian Government. This implementation has been got the main guidance in establishing and adoption the municipal and regional complex safety systems [8, 9].

The range of activities is held the event for constructing and development of the «Safe City» SHC (software-hardware complex) allow doing the qualitative change from the rapid response to risk management by introducing the modern technologies [3].

2. Methodology
Main methods to be adopted for the realization of the development of the concept the «Safe City» hardware and software complex. The following methods are used to realize the «Safe City» software-hardware complex:

I. At the regional level: 1. it is planned to develop and adopt the regional legislation for implementing of the «Safe City» software-hardware complex. 2. It is proposed to train municipal and urban district UDSD (Unified Dispatch Services on Duty) officials and specialists with the programmer components by the «Safe City» software-hardware complex at rehabilitation the Voronezh region training and doctrine civil defense and emergencies centre.

II. At the municipal level: 1. it is given there will be the municipal interdepartmental commission or working group meetings. As a provision on the system m and annual plans that will be approved by its chief the municipal district the «Safe City» software-hardware complex provides the regular consideration of the issues associated with the building, implementation and exploitation by its complex. 2. It is planned to realize the plans of the building or the growth and the implementation of the «Safe...
City» software-hardware complex at the municipal districts. The plans will have to be agreed upon by the General Department of EMERCOM of Russia for Voronezh region. 3. It is deal with the domestic technologies and with the domestic means will to be made available in the creation and the implementation of the «Safe City» software-hardware complex. The video surveillance system will be based only on the analytical functions.

3. Findings
Measures adopted by the Voronezh region for the implementation of realization the «Safe City» software-hardware complex make it possible to ensure the full realization the program on time. The full name of the system: Automatic equipment complex «One-stop centre rapid response» as part of the «Safe City» software-hardware complex of Novovoronezh city urban district (Figure 1). The urban system is being established on the basis of the documents of Russian government [4, 5, 6 and 8]. There are procedures for the preparation and to provide the customer with the results of the work on the establishment of ACC OCRR (the automotive control complex of one-stop center for the rapid response), on production and the start-up the technical means, programmer funds and information tools and on the ACC OCRR. These works have to consist of agreed proposals for managerial decision-making for disaster management. The work should be held in accordance with the KNP (calendar-network plan means: schedule of activities and network plan or NETANAL or contingency plan or emergency plan).

The KNP consists of a lot of parts: it is incising a united information field with crisis management of local authorities’ and municipal facilities and Safety of vital activity enterprise; it is improving the quality to make decisions and plans which are based on analytical methods to assess the situation; it is advertising, the better flow of information, increasing the data and completeness and reliability of completeness of the data used on the basis of their regular mainstreaming by approved regulation; it is increasing the responsiveness of the disaster network plan management process; it is a reduction in the time on find, communication of information and data processing.

The aims of creating the software-hardware complex the urban one-stop center for rapid response (SHC OCRR) are [12]: an improvement in the overall security situation and a rule of law and habitat safety through the automation of the process of co-ordination services through the introduction based on the municipality of the integrated information system which ensures the risk prediction, monitoring and preventing and eliminating; the control to deal with the consequences according to KNP including the integration of information-management system the municipal emergency response centre for their operation cooperation in the interest of municipality; the prevention (in accordance with the KNP) through the development and implementation of the monitoring system and analysis of data; the improving of the responsiveness elimination in accordance with the KNP; the improving of the effectiveness monitoring systems; the improving of the operational collaboration of the emergency response centre through the integration relevant automated systems into a single information area (in case technical and organization possibility).

The software-hardware complex the urban one-stop center for rapid response is intended to address the following main tasks: Data collection and processing the information from various sources (involved automated systems and terminals under their control); the rapid assessment, analysis and forecasting situation; the timely support for the decision-making emergency process to prevent and eliminate (under the KNP); assistance in information supports the relevant services to provide emergency assistance population for life threatening and health, to reduce economic and social losses in KNP; the creation of a unified integrative with connectivity and management of broad spectrum of the terminal application; The timely people information on KNP and on the response results.
Figure 1. The architecture of the «Safe City» software-hardware complex of Novovoronezh city urban district.

The most enduring risks of emergency situations are possible in according with the directive on establishing a working group adoption and development of the «Safe City» software-hardware complex (SHC) at the Novovoronezh city. These risks are nuclear power plant accidents and housing and communal services accidents. The «Safe City» software-hardware complex is based on these risks. The «Safe City» SHC consist of alert and information system, 112 emergency service (or system 112), control laboratory, video surveillance, monitoring of the communal services, fire alarms, emergency call and alarm systems, search and navigational systems.

There are all-possible risks of emergency situations at the Novovoronezh city in table 1.
### Table 1. Risks of emergency situations.

| Risk                                      | The risk is a frequency implementation of event, 1/year | Concrete manifestation                                                                 |
|-------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------|
| **Natural emergencies**                   |                                                        |                                                                                         |
| Strong wind                               | 0.07                                                   | Within the territory of the urban district                                              |
| Hail                                      | 0.05                                                   | Within the territory of the urban district                                              |
| Snow drifts                               | 0.06                                                   | Within the territory of the urban district                                              |
| Wildfire                                  | 0.07                                                   | The territory of the urban district to be at risk                                       |
| Earthquake                                | 0.00002                                               | The territory to be within 6 zone at risk of earthquake rated at 6 on the Richter scale |
| **Social-biology emergencies**            |                                                        |                                                                                         |
| Environmental pollution (environmental risks) | 0.08                                             | Outdoor air and soil and water pollution                                               |
| Epidemics                                 | 0.04                                                   | Cholera, tularemia, anthrax, acute intestinal infections                                |
| **Emergencies at the radiation hazardous facilities** | 0.000001                               | The territory of the urban district to be at the 30 km Novovoronezh Nuclear Power Plant zone |
| Hazardous location emergencies            | 0.09                                                   | The one hazardous location                                                               |
| **Electric power system and communications system emergencies** | 0.06                                                   | Transmission lines 0.4-500 kV                                                          |
|                                           |                                                        | Substation (of a power system), transformer substation, integrated transformer substation 0.4-500 kV |
|                                           |                                                        | Gas-distributing station, gas distribution substation, switching cabinet, low-pressure gas pipeline, middle gas pipeline, high pressure gas pipeline |
| **Housing and public utilities system emergencies** | 0.08                                           | Water system                                                                           |
|                                           |                                                        | Heating systems                                                                        |
|                                           |                                                        | Sewerage system                                                                         |
|                                           |                                                        | Road transport                                                                          |
|                                           |                                                        | Rail transport                                                                          |
|                                           |                                                        | River transport                                                                         |
|                                           |                                                        | Pipeline transport                                                                     |
| **Transport emergencies**                 |                                                        |                                                                                         |
|                                           | **0.08**                                               | The one hydro-technical installation of the first class emergency                        |
| **Hydro-technical installations emergencies** | 0.08                                           |                                                                                         |
| **Terrorist act and fires**               |                                                        |                                                                                         |
| Terrorist acts (a real threat of accidents) | 0.04                                           | The objects to be located on the territory of the urban district                        |
| Fires in a housing sector and on economic targets and transport | 0.06                                           | Housing sector, economic and transport targets                                        |
4. Conclusion
The following activities have been taken place in order to fulfill of preparatory work:

1. All subscribers have been connected to the fibre-optic communication line using providers of mobile service which are fired up not only on the economic targets and the houses – but also in meeting places, including the park, the fountain, the market and the highway.
2. 80 security cameras have been installed by the local budget and the regional budget. 8 of 80 these cameras have also the video content analytics (VCA).
3. These things have been tested [3, 6, 10, 11]:
   - There is «person-police» device in a public park;
   - There are video surveillance of the entrance and warning;
   - It is output metering devices of source of energy information.
4. The navigation satellite system (GLONASS) has been used.
5. The automatic fire alarm has been installed. The socially important objects are 100 per cent covered by automatic fire alarm. The alarm is transmitted a signal to the Firehouse 27.
6. System 112 has been deployed.

The MBO (municipal budgetary office) «Emergency and rescue centre» operates in urban district. This office has to coordinate the activities of the «Safe City» SHC. The extension of the sphere of activity and the range of tasks including the implementation of the «Safe City» SHC necessitated the changes in the functionality of the rooms and the increasing the size. The new building is currently being corresponded with the all mandatory requirement of deployment of UDSD, emergency services and rescuers.

The rescue centre integration in the urban infrastructure allowed the management companies, the «City Electric Networks» and the «Electricity networks» to abandon for their dispatch services, also the management companies are abandoned for the emergency services [3, 12].

Subsequently, functioning of the program the «Safe City» SHC are expected to be released on the premises in the MBO «Emergency and rescue centre» on duty service office:
- To show the CMES NPP parameters (structured cabling systems of monitoring and engineering management systems of buildings and structures for NN NPP (Novovoronezh nuclear power plant));
- It is radiation monitoring system by the UDSD force using the deployed system of ARCS (automated radiation control system);
- It is signalization display about the water wells monitoring results (an unauthorized access, stopping the pumps);
- To show the telemetry of the electricity parameter (a kill switch, operation of a protection, a fire, an unauthorized access);
- To show the telemetry of the gas supply parameter (parameters of pressure: a high pressure, a low pressure, a medium pressure; of a protection, a fire, a unauthorized access);
- It is monitoring of parameter of metering unit the apartment building energy store.

5. References
[1] Gusev M V 2016 The relevant issues of the construction the «Safe City» hardware and software system at the Voronezh region Abstracts of the XII International Scientific and Practical conference (Voronezh: Voronezh State Techical University) pp 5-13
[2] Ovchinnikova T V 2007 Environment of risk and characteristics of emergency situations of the Central Black Earth region of Russia (Voronezh: Origin) 230 p
[3] Peshkov I A On the construction of the «Safe City» hardware and software system at the of Novovoronezh city urban district Abstracts of the XII International Scientific and Practical conference (Voronezh: Voronezh State Techical University) pp 14-16
[4] Federal Law 116-FZ, dated 21 Jul. 1997 «On industrial safety of hazardous production facilities»
[5] Decision No 641 of the government of Russian Federation, dated 25 Aug. 2008 «On the transport equipment, the technical means and technological system by the Global Navigation Satellite System (GLONASS)»
[6] Decision No 697 of the government of Russian Federation, dated 08 sep., 2010 «On ECM System EOS for SharePoint»

[7] Presidential decree No 1632 of the Russian Federation, dated 28 des., 2010 «On improvement the e-call system in the Russian Federation»

[8] Government order No 2446-r of Russian Federation, dated 03 des., 2014 «On the approval of the concept of the construction and development of the concept the «Safe City» hardware and software system»

[9] Government order No2446-r of Russian Federation, dated 03 des., 2015 «On approval of the concept of the construction and development of the concept the «Safe City» hardware and software system»

[10] Decision No of the head of administration of municipality (the urban district) «On the interdepartmental working group on approval of the concept of the construction and development of the concept the «Safe City» hardware and software system in municipality»

[11] Decisions (government orders) of the government of Russian Federation on selected issues of the construction and development of the concept the «Safe City» hardware and software system in municipality

[12] Temporary uniform requirements for technical parameters of segments by the «Safe City» hardware and software system, which were approved by EMERCOM of Russia, date 29 Dec. 2014