Application of GIS for the solving of tasks of decontamination strategies of the contaminated urban areas

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The large-scale and long-term consequences of settlements and the land around them contamination as a result of the Chernobyl accident have made it necessary to develop new approaches and methods for estimating the consequences of contamination and implementing appropriate intervention measures. Even within 16 years after the accident, the radiation situation in populated areas testifies to the fact that local decontamination activities have been justified and effective if the sites for decontamination are appropriately chosen.

The goal of GIS creation is assessment of general contamination of a settlement as an integral landscape object. All the data collected during the initial period suffer on account of their fragmentary character; in many cases the studies are marked by cursory examination of problems. Over this period the investigation on radionuclide contamination for habitable houses (walls, roofs and windows made of different materials), roadway pavements, etc. has been performed mainly in the context of decontamination activities. For the most the investigation results are not classified and the data collected are stored in a form of working reports or even the travel notes and not on magnetic media. It was only several years after the accident that the investigations aimed at finding the detailed distribution of radioactive materials within individual settlements began.

The typical settlements in Ukraine were selected in order to be investigated, their basic characteristic features were collected and systematized. Collected and ranked information has been transformed into a computer databank. An optimal structure to present the information in databank has been developed. A version of initial information classifier destined for arrays of analyzed data is developed. It makes possible to solve some practical problems.

Besides, the purpose of this work is creation of the spatial database with the most considerable parameters of populated localities which had been contaminated in Ukraine, with the aim of further assessment of urbanized territory contamination, dose estimation and influence for the environment, and also with the purpose to solve the problems of decontamination and rehabilitation.

The main demand for the attributive and cartographic information is its convenience of using, data holding free form and data compatibility with International Standards. MS ACCESS format is one of the most employed one for data holding at present that can facilitate collection of necessary information being obtained from the outside sources.

Developed and structured GIS is designed to unite researches being carried out in Ukraine through creation of common geo-informational space. The widespread MapInfo system was chosen as a base geo-information system for the specialized GIS. The “URBDECON” GIS is intended for solving the following tasks:

- analysis and presentation of source data (as maps, tables) with appropriate integration of similar data for investigation;
- estimation of the consequences of radioactive contamination of territories:
- contamination of houses and public buildings and doses to the rural population;
- estimations of the results of wide range of intervention measures applied in order to decrease the contamination of settlements and population doses.