



## **Cavities detector for conductive media**

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In spite of wide variety of electromagnetic (EM) instrumentation for geophysical prospecting and engineering task solution, some of important practical needs are still not satisfied. One of such vital problems is the search of underground cavities of medium size, especially those, which are formed recently in urbanized area due to man-made or natural underground water level changes. The existing instruments, the most efficient of which for such a task are ground penetrating radars (GPR) or transient EM sounders (TEM) can not be used here because of degradation of their parameters by high upper layer conductivity (for GPR) or high EM interference in urban area (for TEM). Some other known devices using monochromatic EM signal sources also can not effectively help here because of scarce self-descriptiveness, which gives too low productivity, depth and conductivity resolution. The works under the creation of the detector for the search of underground conductivity inhomogeneities in urbanized areas are carried out during recent few years in Lviv Center of Institute of Space Research. For increasing device productivity and selectiveness, two sets of three-component integrated sensors and transmitters are used. Additionally the approach based on the quasi-delta function EM source with wide spectrum of generated signals having precisely known set of central frequencies and corresponding digital filters at receiver end is proposed. Such conception allows to improve additionally the system productivity because, instead of series operation algorithm usually applied for multi-frequency systems, the parallel operation with simultaneous registration of all available frequencies set can be realized. The operation algorithm of such a new EM system as well as the peculiarities of practical realization of the device and first experimental results are presented.