

# On the possibilities of using Grid as an external real-time computing device in medical imaging

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At the present time classical Anger algorithm is used for the reconstruction of coordinates of the scintillation in commercial gamma cameras detectors. This algorithm has been proposed 60 years ago because of allowance of its implementation by analog circuits. Now all gamma cameras manufacturers have moved to digital electronic acquisition in the detectors, but this trend did not affect the reconstruction algorithm. In recent years advanced non Anger algorithms are researching. Mathematical modeling shows that using of such algorithms can significantly improve the spatial resolution. However, there are no practical development of this area. The main stumbling block is the necessity of having powerful computing processors within the acquisition electronics. Any variation from the simple Anger algorithm requires a catastrophic increase in computational resources. Single-processor systems can not handle such load. The introduction of multi-processor systems in each detector is expensive and is hardly consistent with acquisition electronics at the level of industry standards.

The rapid development of communication technology allows us to use external devices as computational elements in detectors instead of internal. At the last conference Grid system for storage of medical images was presented by the authors. Currently, this system is actively developed, and several Medical Centers in Kiev have been connected to it at speed of 1 Gigabit or higher. This speed enables us to securely transmit information in real time from all photomultiplier tubes of double-headed gamma camera to the Grid and in order to produce parallel computing reconstruction algorithm using the cluster.

Simulation of the peak flow data from the detector's photomultipliers, transferring these data to the grid cluster, reconstruction of scintillation coordinates and transferring the calculated coordinates back to the detector was carried out. In this way the possibility of using grid cluster as an external computing device in real-time medical imaging modern equipment was demonstrated.