Cooling of electronic circuits is a significant problem for equipment manufacturers. Among the most common solutions that allow heat dissipation from the surface of electronic circuits to the ambient is the use of a heat sink with a fan forced cooling. In practice, this solution is often supported by, for example, heat pipes, an additional liquid flow circuit or phase change interface materials. However, in order to achieve a better cooling efficiency, it is desirable to have a temperature in the system lower than the ambient. The authors of the project propose to use for this purpose a Maisotsenko thermodynamic system. These systems are known as IREC (Indirect Regenerative Evaporative Cooling) technology, and were so far only used for cooling and air conditioning of large industrial installations. The aim of the project will be to develop numerical and physical models of the IREC system having considerably reduced sizes, intended for electronics cooling, in order to test its efficiency and the parameters that can be achieved. Based on the simulation results, a real cooling system will be built, and will next be tested with the use of, for example, a high-speed thermal imaging camera and measuring instruments. The goal of those measurements will be to determine its thermoelectric parameters. As a result, conclusions will be drawn regarding the optimal design of IREC systems dedicated for electronics cooling, their expected effectiveness and efficiency, as well as other parameters important from the point of view of designers of cooling systems dedicated for electronic applications.