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Developing early warning system for the capital of Armenia

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The capital of Armenia, Yerevan city is located at the one of the most seismically active regions of the Armenian Upland. Destructive earthquakes date back as far as the 6th Century BC. According to the data of the Armenian historiography the following destructive earthquakes are known: Dvin (851-893, M=6.5), Talin - Arouch (972, M=6.5), Ararat (1319, 1840, M=7.5), Garni (1679, M=7.0), Tsahkadzor (1827, M=6.5), Spitak (M= 7.0), 1988. These earthquakes caused thousands of deaths among the population and great economic losses in Armenia. Only during the Spitak destructive earthquake more than 25,000 people lost their lives, 20,000 people were injured, and 515,000 people became homeless. Most of the buildings and structures in all the cities and villages of the Northern part of Armenia were almost completely destroyed. In present, the buildings and structures in Yerevan city are designed on ground acceleration values of 0.1-0.2 g, that correspond to intensity 7-8 MSK-64 scale according to seismic zonation map operating in the territory of Armenia up to 1994. It is obvious that the expected value of seismic impact (0.4 g) considerably exceeds the designed values of accelerations of existing buildings and structures and the hazard of great destruction of buildings and structures is evident in case of the possible strong earthquake near Yerevan city.

Earthquake Early Warning Systems (EEWS) around Yerevan city, providing information about upcoming destructive earthquake is getting essential. We have developed the new concept of EEWS for Yerevan city. The new system will consist of the two components: (1) Current seismic hazard assessment and early non-urgent warning (preparation phase): the current seismic regime is evaluated, and in case of relevant hazard the warning will be submitted to the Government and related governance bodies, and, if necessary, to public and communities; (2) Urgent warning (earthquake hit

urban area and rapid information is necessary): the principles of action of the urgent EEWS was developed on the base of velocities difference between electromagnetic waves propagation and seismic waves. It was focused on the solution of the following tasks: possibility and efficiency of EEWS creation around Yerevan city, configuration of EEWS and determination of necessary number of seismic stations, gain in time of the warning in case of upcoming strong earthquake and others.