Doctoral Thesis Proposal: Establishment of an early warning protocol for deformation monitoring using Real-Time Precise Point Positioning (PPP) technique**.**

Supervisor/s: Ángel Martín Furones (Universitat Politècnica de València) and Raquel M. Capilla Romá (Institut Cartogràfic Valencià)

Abstract: Early warning protocols are essential in earthquakes, deformations and landslide damage detection. The proposed protocol should be based in the real-time kinematic coordinate determination of the studied reference points using the PPP technique (technique which frees the solution from the reference frame and works in an absolute way). The coordinates determination should be based on a multiconstellation solution using GPS, GLONASS and GALILEO observations. Open source or free libraries like RTKLIB or BNC software from the BKG (Bundesamt Für Kartographie und Geodäsie) will be used and new libraries will be incorporated in order to solve ambiguities as integer numbers and for the purpose of using new state space representation products. From this starting point, specific software will be developed (mainly using python language) in order to study the following aspects: a) latency of the applied corrections to the real-time observations and the posibilities of a post-process near real-time determination to eliminate this latency and b) the introduction of the standard deviation of the coordinates determination, geometry of the constellations, etc., as a new inputs in the deformation decision making process. This decision making process will be the main core of the PhD development, including the potential of the least squares coordinates variation adjustment as a method for deformation determination. This process will generate an early warning protocol only if the probability of deformation movement is very high.

Available Means: The Department of Cartographic Engineering, Geodesy and Photogrammetry has all the needed instrumentation to obtaind the field observartions. The PhD Project includes the possibility of periodical visits to the Cartographic Institute of Valencia in the framework of the development of the doctoral thesis.

References:

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Student Signature: Supervisor/s Signature/s: