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An Approach for Determining the Geopotential Difference between The Atomic Clocks Ensemble in Space (ACES) and a ground station

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According to the general theory of relativity, two clocks placed at two different positions with different geopotential run at different rates. Thus one can determine the geopotential difference between these two points by comparing the running rates of the two clocks. In this paper, we propose, design and describe in detail an approach for determining the geopotential difference between The Atomic Clocks Ensemble in Space (ACES/PHARAO mission) and a ground station based upon a simulation experiment. The correction due to Ionosphere, troposphere and Sagnac effect will be taken into account. Our team is working on a wide range of problems that need to be solved in order to achieve high accuracy in (almost) real-time. In this paper, we will present some key aspects of the measurement, as well as the current status of the software's development. the proposed approach may have prospective applications in geoscience, and especially, based on this approach a unified world height system could be realized with one-centimetre level accuracy in the near future.