Simulating the performance of next-generation minor-planet surveys

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In considering the optimal means of taking inventory of the near-Earth objects in our solar system and characterizing their nature, origins, and evolution with large-scale surveys, it is necessary to create models of current and next-generation observatories' performance. We have carried out simulations that bracket the range of expected orbital and physical properties of near-Earth-object populations in order to determine the predicted performance of space-based surveys observing at infrared wavelengths. We compare the number of objects detected from space-based surveys operating from different vantage points, taking into account the performance of the current generation of ground-based optical surveys. Among other metrics of survey efficiency, we evaluate the number of detections, velocity distributions, the quality of orbit fits, and the average spatial distributions for different populations of minor planets and different survey configurations.

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