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The NASA Mass Change Designated Observable Study: Progress and Future Plans

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The 2017-2027 US National Academy of Sciences Decadal Survey for Earth Science and Applications from Space classified mass change as one of five designated observables having the highest priority in terms of Earth observations required to better understand the Earth system over the next decade. In response to this designation, NASA initiated multi-center studies with an overarching goal of defining observing system architectures for each designated observable. Here, we discuss the progress made and future plans for the Mass Change Designated Observable study. Progress includes the development of a Science and Applications Traceability Matrix (SATM), the definition of three different architectural classes that are responsive to the designated science objectives, and a framework to quantitatively link the performance of specific architectures to the SATM. We will describe the Value Framework that has been developed to assess the value of potential architectures in terms of science return, cost, risk, and technical maturity. Results highlight the recommendation of satellite-satellite-tracking for the MC observing system, and have identified high value variants as a single in-line pair, dual in-line pairs, and pendulum architectures, which are similar to architectures studied by potential international partners. The current status of the study process, and future plans will be discussed.