Determination of the orbit of Didymoon from past and future photometric observations

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We will present a current solution for the Didymoon's orbit derived from the photometric observations taken in 2003, 2015 and 2017. We will analyze how observations obtained around the next two oppositions 2019 and 2021 will improve the orbit solution and in particular what time distribution and quality of the data will be needed to predict the position of Didymoon with an uncertainty in mean anomaly $< 20^\circ$ at the time of the DART impact in October 2022. We will present that, to reach the goal, it will be necessary to constrain a quadratic drift in mean anomaly due to the BYORP effect. We will show that it is likely not achievable with data taken in only one of the two upcoming apparitions; obtaining data in both will be needed. We will also analyze how potential additional observations (one event epoch) taken with the Hubble Space Telescope in August-September 2020 could improve the orbit solution and we will estimate whether they will be really needed, or if ground-based observations only will be sufficient to reach the goal of accurate prediction for the position of Didymoon at the time of the DART impact.