



Comet Interceptor: A proposed ESA Mission to a Dynamically New Comet

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In response to the recent European Space Agency's call for proposals for a Fast (F) Mission, a multi-spacecraft project has been submitted to ESA to carry out a multi-point study of the solar wind and to encounter a dynamically-new comet. Such an encounter with a comet approaching the Sun for the first time would provide valuable data to complement that from all previous comet missions, which have by necessity studied short-period comets that have evolved from their original condition during their time orbiting near the Sun. The spacecraft would be delivered to L2 with the ESA Ariel mission, and would therefore by default be placed in a holding location suitable for later injection onto an interplanetary trajectory to its target. Suitable cometary targets would be searched for prior to launch, and after launch if necessary, with a short period comet serving as a backup target. With the advent of powerful facilities such as the Large Synoptic Survey Telescope, LSST, the prospects of finding a suitable dynamically new comet nearing the Sun for the first time are very promising. The possibility also exists for the spacecraft to encounter an interstellar object if one is found on a suitable trajectory. A known short-period comet will act as a reserve target. Following insertion onto an interplanetary trajectory, the subspacecraft would be released from the primary craft. With suitable instrumentation, these would allow valuable multi-point measurements of the solar wind over different lengthscales as these craft separate. For the comet encounter, the primary spacecraft, planned to also act as the primary communication point for the whole constellation, would be targetted to pass outside the hazardous inner coma, on the sunward side of the comet. At least one subspacecraft would be targetted for the nucleus/inner coma region. The various component spacecraft will carry a range of miniaturised instruments for remote and in situ studies of the object's composition, nucleus, coma, and plasma environment. Following an initial proposal submission stage in October 2018, Comet Interceptor was selected by ESA as one of only six submission invited to submit a full proposal by March 2019. The mission proposal is currently undergoing evaluation by ESA.