

Following recommendations from the 2023-2032 Planetary Science and Astrobiology Decadal Survey, we propose a novel pre-phase A level Uranus exploration mission that is centered on using swarms of small spacecraft to observe the Uranus system. This mission could support the Uranus Orbiter and Probe detailed in said Decadal Survey, acting as a supplemental to the flagship level mission. We propose launching a 4,500 kg spacecraft on a Jupiter-Uranus gravity assist transfer trajectory with a transfer time of six years, having the spacecraft arrive at Uranus in 2039 after launching in 2033. This shorter transfer and accelerated development timeline would allow for an earlier arrival date than a traditional flagship spacecraft, which would make it possible to observe the changing of the Uranian seasons from solstice to equinox, helping us better understand the atmospheric dynamics. To maintain the quality of data collection while minimizing mass, we propose that the spacecraft will be composed of a carrier spacecraft with a 3,848 kg wet mass, which would be used primarily for communications and orbital transfers, and a swarm of CubeSats with a combined wet mass of 640 kg, which would house the instrumentation. The swarm of 16 CubeSats of approximately 40 kg each would be divided into 4 groups of 4 identical spacecraft. Each group will be equipped with specialized instrumentation, exploring Uranus more extensively and from multiple angles simultaneously. This spatial distribution of the instrumentation would allow for measurements that require multiple perspectives of observation, such as radio occultation and precision gravity measurements. This research demonstrates that a high level analysis of such a deep space small satellite mission converges to a viable solution and invites experienced professionals to join the idea and perform further validation of the concept.