Laser Ranging to Measure LightSail Orbit Raising

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The LightSail 2 project will demonstrate controlled solar sailing in Earth orbit from a 3U CubeSat platform. Scheduled for launch in late 2018, LightSail 2 will be injected into a 720 km, 24 deg inclination orbit. Following an on-orbit checkout period, LightSail 2 will deploy a 32 square meter solar sail, and control the sail orientation relative to the Sun to raise orbit apogee. Simulations show that apogee raising of 600 m per day is possible. Laser ranging to determine the LightSail 2 orbit is planned both before and after sail deployment. With no global positioning system receiver on board the spacecraft, LightSail 2 is dependent upon two-line element data sets for coarse orbit determination. Laser ranging measurements will provide refined orbit determination prior to sail deployment. Following sail deployment, additional laser ranging observations are planned, although targeting will be challenging due to the rapidly changing orbit. Stations within 30 deg of the equator will be able to observe LightSail 2. Laser ranging provides critical information to determine the success of this first mission to demonstrate controlled solar sailing, and The Planetary Society looks forward to working with the laser ranging community during LightSail 2 mission operations.