

Small Body Landers for Near Earth Object Missions. K. Klaus, T. S. Cook, and D. B. Smith, The Boeing Company, 13100 Space Center Blvd, Houston, TX, 77059, (kurt.k.klaus@boeing.com, tim.s.cook@boeing.com, david.b.smith8@boeing.com).

Introduction: Our Our studies have concluded that PI-class science small body missions are possible with telecommunications infrastructure solar powered spacecraft. These spacecraft are flight proven with more than 60 yrs of cumulative in-space operation and are equipped with highly efficient solar arrays capable of accessing a wide variety of small bodies.

Coupled with this capability, we are developing a “small body lander product line that leverages the significant investments that have been made in the highly successful DARPA Orbital Express program. Orbital Express demonstrated autonomous rendezvous, close proximity and capture with a passive space object, both capabilities that can also support autonomous precision “landings” on small bodies. An OE based NEO exploration lander can provide up to 100kg of science payload and 200 W of power available to the science payload. Our studies indicate that some of these missions can be accomplished within Discovery class budget, and most within a New Frontiers-class budget.

OE autonomous robotic technology enables equipment relocation, surface sampling, sample retrieval and stowage, spacecraft and/or science instrument reconfiguration and alternate means of lander recovery. OE’s capture system technology enables repeatable lander and probe deployment and capture including lander refueling, setting in motion the design of missions to multiple small bodies and multiple sites on target bodies. Enhancements have been made to the navigation algorithms to enable precision natural body navigation.

For science measurements that only require very small mass and power, we are developing nanosats that offer “full spacecraft-like” capabilities, e.g., 3 axis stability and control and on-board propulsion.