Small Bodies Assessment Group

Questions Regarding ARM

(1) What are the target constraints for ARM? Assuming a launch date, are there hard limits on outbound/return delta-v and mission duration, target size, mass, and spin- state? How many years in advance of launch must a target be identified and characterized?

(a) What is the orbital element space, including true anomaly, within which a target must reside? This will drive calculations of target locations and distances that feed into detectability by surveys.
(b) Allowable spin states (e.g., maximum rotation rate, complexity of rotation state). This can be compared to what is known about the distribution of rotations as a function of NEA size.
(c) Is there a desired composition? This feeds into detectability (albedo) and the fraction of the available population.
(d) Can the ARM target be binary or a multiple system?

(2) What are the required tolerances within which ARM target characteristics must be determined? E.g., size within 1 meter? Mass within a metric ton? Principal rotation period within 5 minutes, depending upon the period? Orbital elements such that target positional uncertainty at the time of navigation acquisition is within Y km? Binary yes or no?

(a) Can these tolerances be determined using existing ground-based and space- based assets?
(b) Does the determination of any tolerances require a precursor mission?

(3) Given our knowledge of the NEO population and existing ground-based and space- based assets, what is the expectation value for the number of targets that will be discovered meeting ARM requirements over the next decade? Until the time required for discovery to support the nominal ARM launch date?