

SMALL LANDING PROBES FOR IN-SITU CHARACTERIZATION OF ASTEROIDS AND COMETS. D. Ebbets, R. Reinert, and R. Dissly, Ball Aerospace & Technologies Corp. (1600 Commerce St., Boulder, CO 80301, debbets@ball.com).

Introduction: Future space missions to small solar system objects such as asteroids and comets may include probes that can land to enable characterization of both the surface and interior. In many cases more than one probe may be desired to sample different regions or to work together as a network of sensors. This poster describes a design concept for such a probe under study at Ball Aerospace.

Surface Probe Description: The probes are roughly the size of a basketball (Fig 1), allowing for several to be carried by a rendezvous spacecraft and deployed individually. They are designed to survive a freefall to the surface, impacting typically with a velocity of less than a few meters/second on small bodies. Deployable panels on the nominally spherical body ensure self-righting to an operational orientation (Fig 2).

Each probe accommodates a payload of several kilograms, optimized for its particular investigation. Candidate payloads include imagers, accelerometers, X-Ray spectrometers, sample collection and examination mechanisms, and possibly pyrotechnic charges for seismic excitation or cratering experiments (Fig 3).

Each probe provides a standard suite of services such as battery power, data management and communications with the rendezvous spacecraft. We are also studying options for mobility, such as “hopping”, and for anchoring to the surface of a micro-gravity body. Such a basic probe could become a low cost component of future missions that would enable a rich spectrum of in-situ investigations to a large number of target bodies.



Figure 1 – Stowed probe (diameter 30cm)

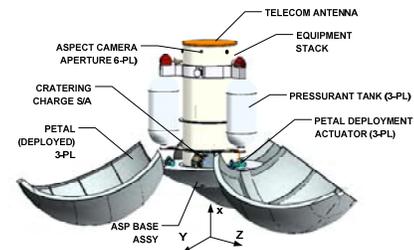


Figure 2 – Deployed probe

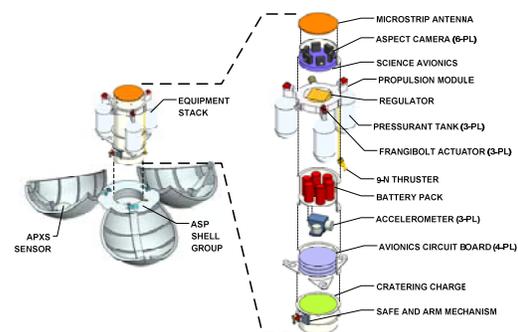


Figure 3 – Exploded view of probe