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COMMERCIAL DELIVERY OF LUNAR PAYLOAD

Abstract

This presentation describes a financial and technical model for commercial of lunar landing capability. This includes a discussion of our model for payload services, and Griffin, a lunar lander that is core to the model.

In the nominal mission revenue model, Astrobotic sells payload to one or multiple customers to fill a manifest, and generates revenue from sponsorships and other commercial activities, a customer could buy all or part of the available payload capacity. The pricing strategy is to charge a nominal price per kilogram of 1.2$M/kgfordeliverytothelunarsurface.Payloadcanbedeployedincruiseororbitwithalternativepricingstructures.Furth$
$surfacemobilityanddropoffinlunarcruiseorinorbit(potentiallyforsatellitedelivery)$.

The Griffin lander precisely delivers small and medium class payloads to any destination on the Moon. Griffin's flexible payload mounts can accommodate a variety of rovers and other payloads to support robotic lunar missions like lunar polar volatile prospecting, sample return, geophysical network deployment, skylight exploration, regional prospecting, and mining. Details such as size of launch vehicle and solar arrays, orientation of high-gain antennas, and sizing of thermal radiators are customized for destination and purpose, while structure, propulsion, power, avionics, communications, and guidance, navigation, and control are invariant. Griffin launches on a third-party launch vehicle. A SpaceX Falcon9 is currently under contract for launch in October-December of 2015. Medium-class payload capability in future missions is obtained with a larger launch vehicle, such as a Falcon Heavy or SLS. After achieving Low Earth Orbit, the launch vehicle second stage reignites for trans-lunar injection. Following a 4.5-day cruise, Astrobotic's lander establishes a 100km circular orbit, corrects its state estimation errors, and initiates deorbit by entering a 15km periapsis orbit. Deorbit is followed by a 20-minute powered descent phase. During powered descent, Griffin autonomously aligns real-time data from cameras and LIDAR with existing satellite imagery to navigate to a precise landing location and maneuver past hazards to safely touchdown.