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**AN APPROACH TO SAMPLE RETURN MISSION ARCHITECTURE TO IMPEDE
PLANETARY CONTAMINATION**

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ABSTRACT

Returning samples from near-earth objects and other planetary bodies has been a fascinating endeavour to space explorers for decades due to its more scientific return with small intimal investment. Similarly, it is considered to be an effective progressive step before striving towards crewed missions to any interplanetary destinations. Sample return enables us to perform distinct methods of investigation procedures in our ground-based laboratories which are limited on any other planetary surface. Despite its significance, no sample return architecture has gone beyond study phase except NASA's OSIRIS-Rex and JAXA's Hayabusa 2 to return samples from solar system planets. And the return of samples to our terrestrial lab may have an increased rate of planetary back contamination. So in order to mitigate these issues, we provide numerous sample return approaches to redirect samples from the celestial body to either International Space Station or the labs on Lunar surface for proper screening and investigation procedures. Further, our study provides various methods to return samples from the perspective of planetary protection policy as part of planetary defense. Analyzed and screened samples can be further redirected to our terrestrial lab for analysis through the physical method, and it ensures zero back contamination. Finally, we have discussed the mission feasibility based on current maturation of technology along with the prospect of future interplanetary sample return missions. A simple schematic map of sample return architecture is shown in the figure below.

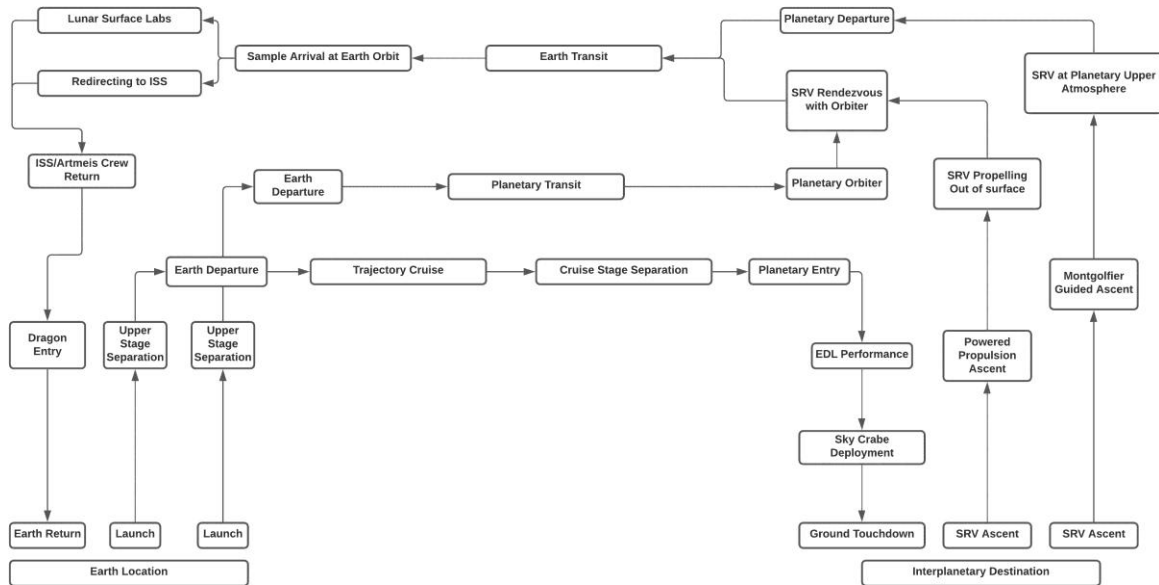


Figure 1 Schematic map of sample return architecture (Considering Planetary Protection Policy)

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