GLOBAL ENTRY CORRIDOR: ACCURATE TOOL FOR LANDING SITE SELECTION IN PLANETARY EXPLORATION

D. Bonetti*, R. Haya Ramos

DEIMOS Space S.L.U., Tres Cantos, Madrid, Spain
davide.bonetti@deimos-space.com

ABSTRACT

Different objectives and constraints drive the selection of the landing site for a planetary entry probe. On one side the mission goals typically drive the scientific need, while technology and budget constraints typically drive the engineering capabilities of the mission.

Requirements and goals can be strictly defined and formalized, resulting in landing site conditions where the objectives and constraints are met. This information can be synthetically organized into planetary maps that are the contact point between the two sides driving the landing site trade-off.

With a literally world-wide range of solutions, an efficient tool for feasible regions generation and identification is necessary to optimize the time resources available for the mission definition and to focus more detailed and time consuming analyses on the most interesting and feasible planet regions.

Feasibility is the respect of a set of engineering constraints that are typically driven by limited mission robustness to wide environment variability. When the planet is surrounded by an atmosphere, one of the key drivers is the satisfaction of the entry phase constraint. The entry corridor is the concept typically implemented to analyse this critical mission phase.

The Global Entry Corridor (GEC) is the extension to a planetary scale of the entry corridor concept. It allows for the desired efficient generation of the engineering constraints maps associated to the critical entry phase at a planetary level.

This paper deals with the role of the GEC in the target site selection process as a flexible platform where any scientific goal can be naturally integrated through the combination of filtering maps. It is an efficient tool capable of providing a quick answer to the matching between the scientific needs and the engineering capabilities allocated for the mission.

Practical applications of the GEC to European Mars explorations projects like Exomars and Mars Next are shown in this paper.