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Author: Mr. Walter Campo
Politecnico di Torino, Italy, s291604@studenti.polito.it

# ANALYSIS OF THE BUSINESS MODEL FOR MISSIONS TO VENUS

**Abstract**

This paper analyses the possible business model behind future missions to Venus, discussing the revenue that such missions can provide and whether they will constitute a cheaper alternative to more traditional ways of performing space missions. The following study is conducted only from an economic point of view, without taking into account potential governmental interests. The potential profits of building propellant depots in Low Venus Orbit are analysed, with a major focus on extracting CO2 from the atmosphere and decomposing it into CO (fuel) and LOX (oxidizer). This could be useful for refuelling spacecrafts before they head to further destinations: a spacecraft would need to carry less propellant on board, leading to the advantage of building smaller tanks and optimizing the size of the satellite to fit in smaller and cheaper launchers. To assess if this solution is profitable, the cost of bringing less propellant from Earth and refuel on Venus is compared with the cost of bringing all the propellant from Earth. The extreme temperatures on the surface of Venus and the large amount of solar energy available thanks to the proximity of the planet to the Sun could be exploited to perform manufacturing processes. An analysis is carried out on the potential gain in shifting part of the manufacturing processes from Earth to Venus, considering both the following options from an economic perspective:

- to bring the products manufactured on Venus back to Earth and sell them. It is verified if the transportation costs are balanced by the lower production costs;
- to store the produced items on Venus and use them to support future missions.

The business analysis is conducted in the frame of a Venus exploration mission that is the object of a 6-months project work involving the students of the 2nd level Specializing Master in SpacE Exploration and Development Systems (SEEDS). The SEEDS Master Program is conducted by Politecnico di Torino (Italy), ISAE-Supaero (France) and the University of Leicester (UK). The master is supported by Thales Alenia Space, the European Space Agency (ESA) and the Italian Space Agency (ASI).