

1.1 Project Scope

1.1.1 Project Description

The objective of this project is to design a reusable device for the new lunar lander module that will dissipate the impact energy in such a way that it does not damage the vessel or occupants.

1.1.2 Key Goals

The overarching goal of this project is to ensure the safety of human passengers and equipment onboard the lunar lander module. The astronomical cost of launching matter into space requires that the device be as lightweight as possible. The goal is to develop a device that can be used more than once without needing substantial maintenance.

1.1.3 Markets

The primary market for the project is NASA. Secondary markets include other national space agencies, such as the European Space Agency and Roscosmos, as well as corporate space programs, such as Space X and Virgin Galactic.

1.1.4 Assumptions

Assumptions are made to help limit the scope of the project. It is assumed that the project will be done using SI units. The device is assumed to be only used on the lunar surface. It is assumed that the device will only operate in the vacuum of space. It is assumed that the attachment points for the legs will be provided by the sponsor. It is assumed that the lunar lander module will have four legs. It is assumed that the mass of the lunar lander will not be more than twice that of the Apollo lunar lander. It is assumed that the maximum landing speed will be 3.048 m/s (10ft/s) (NASA Apollo Lunar Module (LM) News Reference, 1999). It is assumed that the device will be subjected to the full range of lunar surface temperatures, 25K – 400K (NASA, 2014).

1.1.4 Stake Holders

The primary stake holder in this project is the project sponsor, NASA, who is assigning this project through Rachel McCauley. The faculty advisor for the project, Keith Larson, and the teaching faculty in charge of the senior design program, Dr. Shayne McConomy are also stakeholders in this project. Additional stake holders are the American taxpayer and the FAMU-FSU College of Engineering.