

Integrated: A Student's Guide to Systems Engineering

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Purpose

The purpose of this student guide is to describe Systems Engineering for fellow undergraduate students at The University of Alabama in Huntsville (UAH). The guide was first written based on the author's interest in the field and wish for a clear definition of it to be directed to students. The guide will be added to the UAH website so that students can access it. Through this guide, the author hopes to help fellow students become interested in Systems Engineering and to help them discover their own passion.

“Systems Engineering (SE) takes multiple components and integrates them to form a system within a specific environment for a specific purpose – to fulfill a specific need in a dynamic world.” – Integrated, Part 1

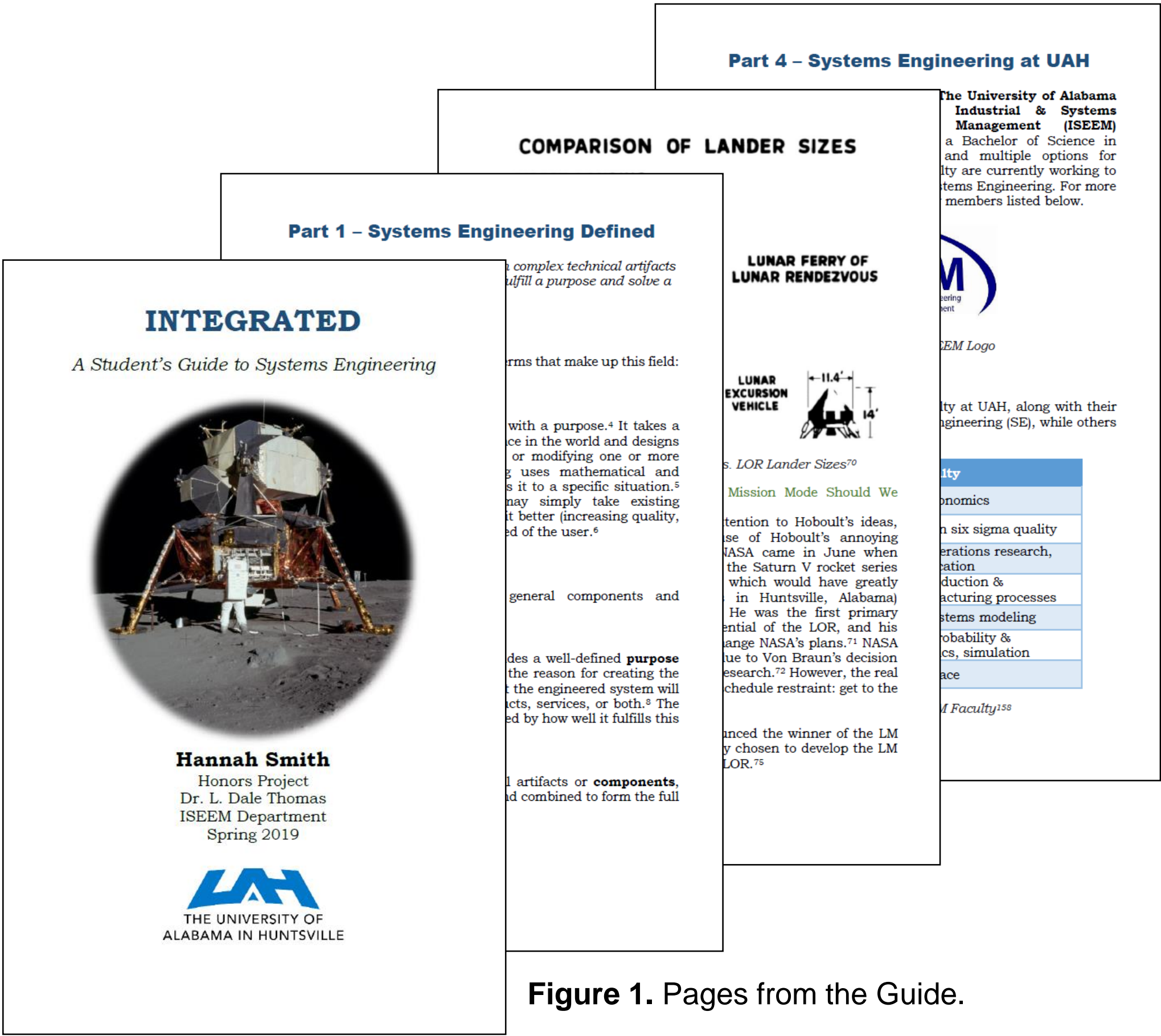


Figure 1. Pages from the Guide.

“Systems Engineering is not becoming integral to today's world – it is integral. If you enjoy all your engineering courses, from thermodynamics to circuits to statics, you may have a passion for Systems Engineering and should check it out.” – Dr. L. Dale Thomas

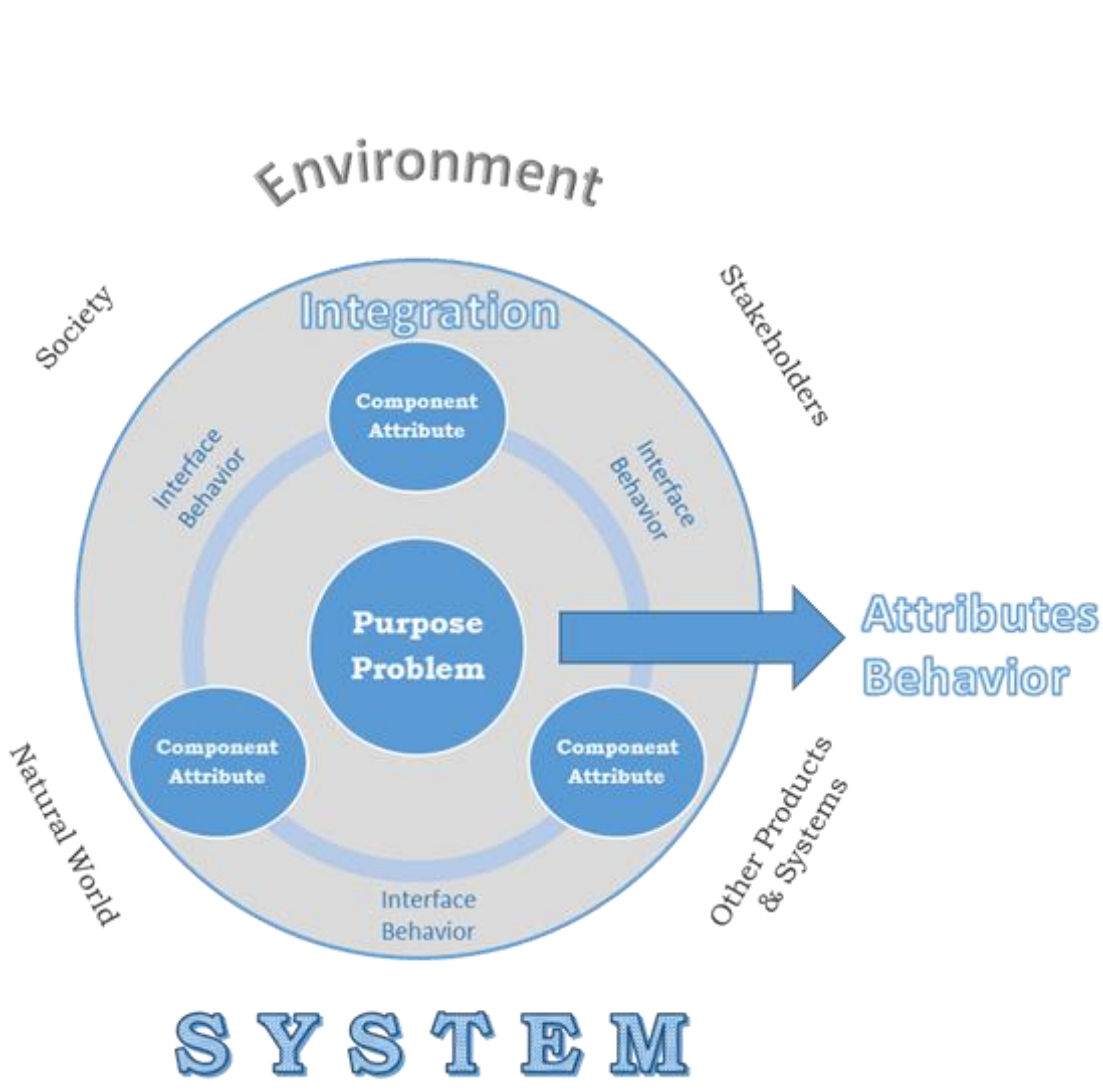


Figure 2. Diagram of a System.

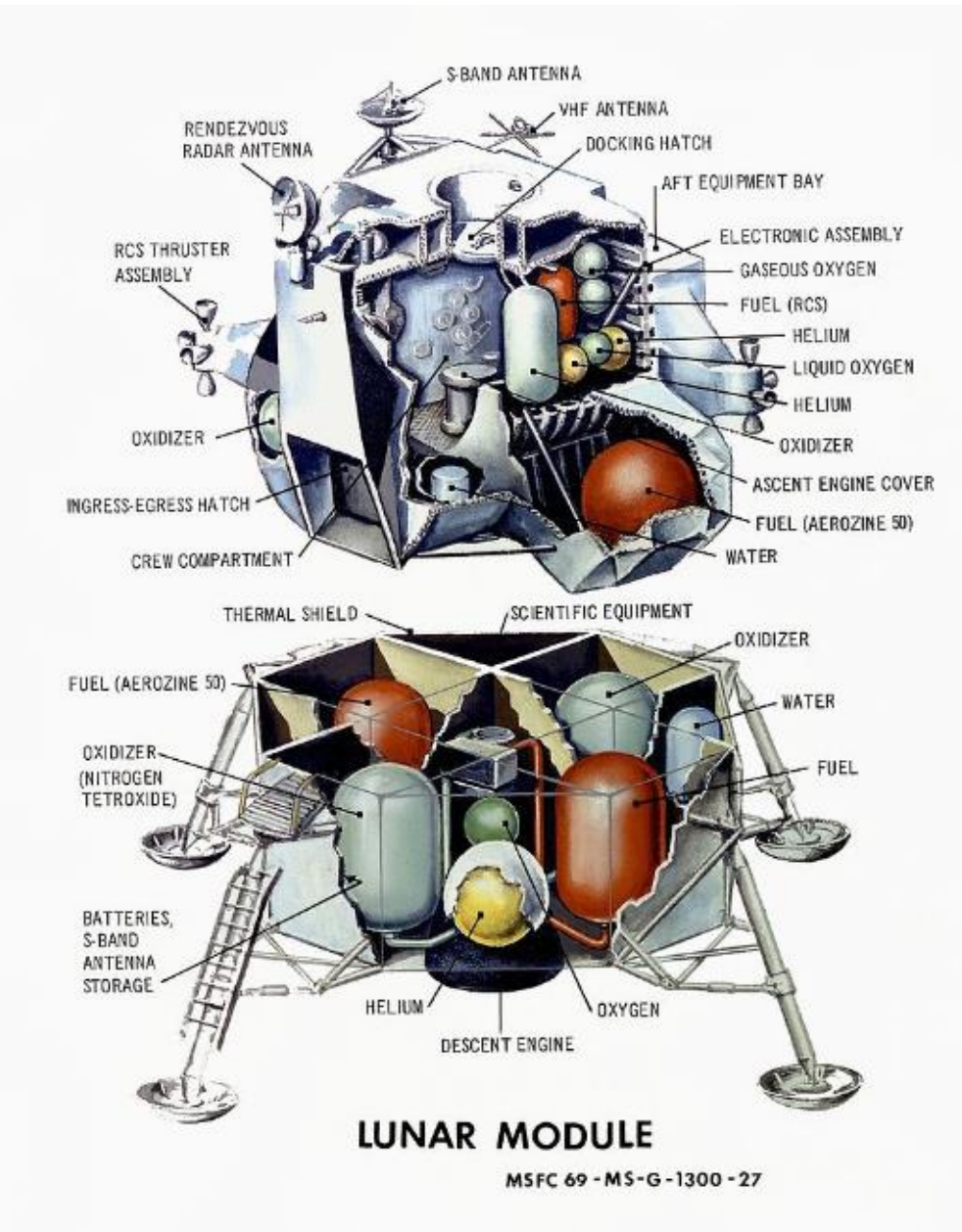


Figure 3. Diagram of the Apollo Lunar Module.

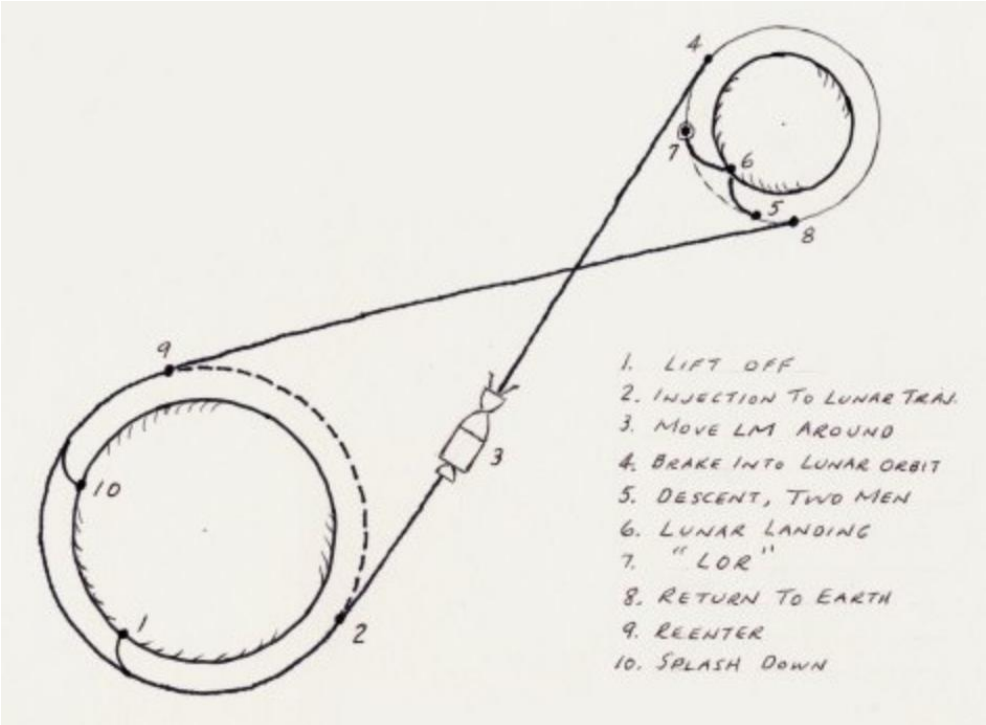


Figure 4. Sketch of the LOR mission mode.

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Meher Dhamoon, for presenting the poster in the absence of the author

Contents

This guide defines Systems Engineering and describes it through its critical thinking process (systems thinking) and the system life cycle. The guide also demonstrates how Systems Engineering is an intriguing career field, using the development of the Apollo Lunar Module as an example of good Systems Engineering practices, particularly in mission definition: the decision for the Lunar Orbit Rendezvous (LOR) mission mode and the writing of the Design Reference Mission (DRM).

Table 1. Contents of the Guide.

Systems Engineering	Apollo Lunar Module
Part 1 – Systems Engineering Defined	
System + Engineering	SE in Apollo Program
SE History	SE in Lunar Module
Part 2 – Systems Engineering Described	
Systems Thinking	Lunar Orbit Rendezvous
System Life Cycle	Design Reference Mission
Part 3 – Systems Engineering Performed	
Mindset, Tasks, Careers	Lunar Module Engineers
Part 4 – Systems Engineering at UAH	
ISEEM Faculty	
ISE Classes	