

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
How Can We Best Apply Our Experience to Future Human Missions? (2)

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MODIFIED GEMINI CAPSULE AND LANDING SYSTEM DESIGNS

Abstract

Mechanical and Aerospace Engineering (MAE) students at the University of Alabama in Huntsville (UAH) have developed various preliminary designs of a modified Gemini Capsule and Landing System (CLS) in fulfillment of their senior design project requirements. The project sponsor, Americans in Orbit-50 Years (AIO-50), is a non-profit organization committed to promoting and accelerating interest in space exploration. The goal of AIO-50 is to commercially launch undergraduate and graduate student designed experiments into Low Earth Orbit (LEO). AIO-50 specified the need for a CLS in order to safely land, after atmospheric re-entry from LEO, a manned capsule on land. This method for landing is a new development compared to all previous United States (US) capsule based space flight missions. All prior capsule dependent missions culminated in an ocean splash down. The CLS designs were developed utilizing numerous original Gemini drawings. The CLS design project provided real world experience in the design of a complex space flight hardware system utilizing an integrated design team approach. The design team focused upon the creation of various preliminary designs of the capsule, landing gear and parafoil descent systems. Extensive technical analysis provided details of aerodynamic and impact forces. Modeling and simulation tools such as Finite Element Analysis (FEA) were critical during the design process as experimentation and prototyping of the full scale system was not feasible. This paper describes the multi-disciplinary design team approach and details of the various CLS designs generated by the MAE student design team.