



**DESIGN AND DEVELOPMENT OF AN
OBSERVATORY DOME AND SHUTTERS
STRUCTURE**

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ABSTRACT

The main objective of this study is to design and develop an observatory dome and shutters structure. The dome has been designed to improve and innovate the current design structure. The design of an observatory dome is able to rotate 360° azimuth rotation whereby its dome and shutters opening and closing are designed by using geodesic structure which is different from the current and common shutters design. Basically, geodesic structure is a joining of hundred or more triangles in obtaining a hemisphere shape. The structure has a better strength and toughness compare to the other structures. Thus, the structure has lower possibility to fail, bend or collapse due to the structure design. The designs of the observatory dome and shutters structure were done using CATIA V5R14 software. The material used is mild steel for the structure and aluminum plate as the roof cover. This design and development of an observatory dome and shutters structure will contribute a lot to the aerospace industry indirectly and will also give benefits to the engineering field.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION OF PROJECT

Throughout history, domes have been covered some of the most important buildings. Because of their shape, domes are some of the strongest and stiffest structures that can be constructed. The super strong dome shape exists in nature in the domed shells of turtles. Ancient builders copied the shape in tent like structures. Sometime around 100 A.D., Roman builders discovered that if they took an arch, and rotated it in a circle, they could create the strong dome shape. The invention was revolutionary, and soon they were using rotating domes to make it easily for observation. The current observatory features of the dome which has a two door shutter system such as the lower shutter door flips outwards, while the upper door glides open and closed [1].