

Historic Aviation Case

The history of aviation is filled with airplanes that represent the pinnacle of design, which transformed how we fly today. Preserving this history of aviation is extremely important to understand how today's aerospace has evolved from the days of dreaming about flying to making it a reality. US Navy has donated a number of historical planes to the Castle Air Museum in Atwater, California, which is one of the largest aviation museums on the west coast. Locating, restoring, preserving and displaying these historic planes is a real challenge for the museum staff. This is especially problematic for aircrafts parked outside at the Eagle eye Airfield where planes get exposed to extreme weather, such as heat on a daily basis. One of the museum aircrafts is B-24M Liberator, which was manufactured from 1940-1945 and widely used during World War II. The Liberator has been exposed to the natural elements given that it has been on display on the airfield since 1982.



The aircraft cockpit reaches extreme temperatures of up to 140 degree Fahrenheit, which has harmful effects on the historic fabric of the interior fixtures, materials, and equipment of aircrafts. A nose wheel opening on the floor of the cockpit is the only outlet for flow of air. The managers at the museum need to urgently address this degradation of aircraft material in order to preserve the aircraft. The lack of a pressure cabin makes it difficult to circulate the air without extreme cabin modifications, which are costly and would alter the historical layout of the plane. Your team has been asked to design a solution that stops or reduces the factors that lead to aircraft deterioration without making significant changes to the museum's historical artifacts. Your team should design a solution using the Stanford design thinking model (empathize, define, ideate, prototype, and test) given certain constraints, such as preserving the original parts while being aesthetically appropriate, considering the electrical limitations and not being too cost prohibitive in development and maintenance.



Your goal is to learn about the issues that are important to the museum in dealing with this problem of deteriorating B-24M aircraft (*empathize*). Based on the information provided in this case (and some extrapolating), provide what issues/problem are faced by the museum (*define*). Within your group, you need to think about probable solutions to address the problem (*ideate*). As the engineer team involved in developing a solution to save the B-24M liberator what steps will you take? Propose a prototype model as a part of your solution that stops or reduces the factors that lead to aircraft deterioration. Finally, *test* your solution by presenting it to your peers which will help you look at the limitations in your solution.