Stable Nature of Dihedral Wings

Team: Just PLANE Awesome (JPA)

Team 3

Xxx,xxx,xxx

Left to right respectively.

Part 1: Site Visits

Maker Space (Gross)

Melanie, Huy, and I visited the Maker Space at 2:00 pm on September 27th. We learned that the Maker Space can be used for class projects, senior design projects, and even personal projects. The facility has a variety of equipment to design and create projects. This includes, but is not limited to, 3D printers, CNC Routers, soldering stations, and CAD Modeling computers. There is also no cost for 3D printing, unlike the DSL. The Maker Space also offers classes to teach students how to use PTC CREO and how to solder. We will likely use the Maker Space for our project.

Digital Scholarship Lab (Tran)

Zac, Melanie, and I visited the DSL at 5 pm on Sunday September 22nd. We learned that DSL is the place that students can go there to study and use the advanced technology that the DSL provides for them. The DSL offers graphics intensive applications, rendering & visualization, video display wall, interactive computing, geographic Information Systems (GIS), large-scale multi-touch displays, virtual Reality,

prototyping and creation (3D printing, scanning, etc.), textual analysis, and data management. The DSL also lend out some technology devices such as high-quality cameras and recorders, go pro cameras, 360-degree cameras, VR devices. The DSL will be a great place to work on our project.

Harris Student Design Center (Rivera)

Huy, Zac and I visited the Harris Student Design Center (HSDC) on Sept. 23rd at 2:30 pm. Once there, we couldn't get full access of the student work area due to remodeling, but we spoke to the of the student representatives and got the chance to talk more with them about the opportunities offered in the HSDC. As students, we would be allowed access to a variety of tools such as waterjets, laser cutters, foam cutting machines, soldering stations, simulators and other machines. In order to work on and progress on projects using the HSDC, we must take courses on each of the stations prior to arriving and obtain certification.

Part 2: Project Idea

Aerospace Concept (Rivera)

The aerospace concept that we would be revolving our project around is more on the aeronautical side of the field. The topic we are going to elaborate and explain will be the concept of dihedral angles and their effect in flight. A dihedral angle is the upward angle in reference to the horizontal level of the wings on an aircraft. In respect to a plane's wings, depending on their design, there are three main designs that include the dihedral angle, zero angle and the anhedral angle. Out of the mentioned designs, dihedral angle allows for the most stability and relatedness to the dihedral effect, which is the rolling momentum of a non-zero angle. When wings on aircraft are structured in a dihedral angle manner, they help keep the aircraft's wings level. When the aircraft banks to one side, because of the upward angled wings, the relative wind strikes the opposing side which causes the wing to roll in the opposite direction, leveling out the aircraft.

Visual Aid and Audience (Tran)

We will design and create 3 different wings- one with flat angle, one with dihedral angle, and one with anhedral angle- to test the stability of each and find out which one has the best stability. We will also make a small wind tunnel to test the wings. Our audience will be our fellow engineering friends.

Process (Gross):

To create our CAD model, we will most likely use the 3d printers in the MakerSpace or DSL. Our product will be made out of many materials including foam, wood, and metal. We will likely make or wings out of foam or foam board. Wood and metal will be used for the stand to hold our wings. Our wind tunnel could be made out of a box fan.

CAD Model of Wing Bracket