Objectives:

To explore 3D scanned and printed aviation-related accessories and applications such as, cockpit covers, canopy covers, cabin covers, wing covers, tail covers, empennage covers, engine covers, cowling covers, full cover sets for entire aircraft, engine inlet plugs, internal heat shields or sunshades, fitted hangar dust covers, propeller covers, spinner covers and carpets etc…using three dimensional scanning/printing technologies;

To recognize how 3D scanning/printing can be used in aviation industry in general, General Aviation (GA) industry in particular;

To examine 2D and 3D methods of design and production of custom-made/custom-tailored accessories;

To explore new technologies and software such as Optitex for scanning, pattern drafting, pattern cutting and assembling;

To investigate and explore appropriate fabrics and materials that can be used in printing/producing user-friendly, environmentally-friendly, sustainable, durable and affordable aircraft accessories.

Partial or Full Covers for Aircrafts: Design and Production

There are approximately 200,000 General Aviation aircrafts in operation in the US in 2013. Not all of those aircrafts are in open/close-up hangars for many different reasons such as availability of hangars, the high costs to rent hangars etc. There are not many solutions to protect aircrafts from costly weather damage as there are thousands of aircrafts left in open air exposing to sun and other harsh environmental conditions such as dust, wind etc. Therefore, user-friendly, well-fitted, well protected from sun, heat, wind, dust, snow, ice, insects/animals and reasonably priced aircraft covers can be appealing to many GA aircraft owners and pilots in the US/overseas.

There are a few companies produce partial aircraft covers but scarcely any full cover manufacturers. The challenges are: To introduce/educate/market custom-made, easy to use, effective full or partial aircraft covers to wider GA pilots and aircraft owners in the US/overseas; To explore fabrics and materials that can be used in printing/producing user-friendly, environmentally-friendly, sustainable, durable and inexpensive aircraft accessories.

General Aviation: • Includes over 360,000 general aviation aircrafts worldwide…of which 209,000 aircraft are based in the United States. • Contributes more than $150 billion to the U.S economy annually and employs more than 1.2 million people…flies almost 25 million flight hours a year.

Methodology:

To delineate and specify a 3D scanned, designed and printed aviation-related accessories in the context of new technologies and software will be the paramount focus of this proposed study. In this research, application of case study methods have been designated in the areas of software and technology exploration/design.

At the conclusion of the research, communicating the results of the research to other researchers and to the broader aviation community will be conducted in a few different ways, i.e. air shows, aviation-related journal articles, industry-related conference papers and aviation-related prototyping/manufacturing.