Department of Electrical and Computer Engineering
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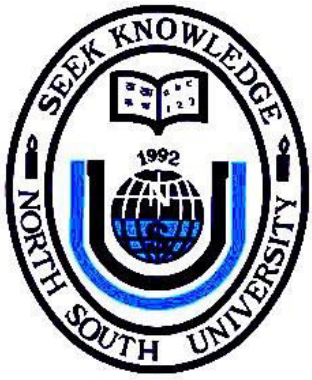

Senior Design Project

Metasurface Based Solar Sail for Flexible Attitude Control

Team Members:

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Fall 2020

DECLARATION

This is to declare that no part of this report or the project has been previously submitted elsewhere for the fulfillment of any other degree or program. Proper acknowledgement has been provided for any material that has been taken from previously published sources in the bibliography section of this report.

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APPROVAL

The Senior Design Project entitled **"Metasurface Based Solar Sail for Flexible Attitude Control"** by Taniz Mahmud Fahim, Fatema Quadir Tamanna and Sabid Hossain has been accepted as satisfactory and approved for partial fulfillment of the requirement of BS in Electrical and Electronics Engineering degree program.

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ABSTRACT

Impact in optical force produced by a supercell meta-surface based on various types and lengths of meta-materials has been a topic of scrutiny in recent times. In our research, we proposed a new supercell structure, conducted both theoretical and experimental analysis to demonstrate how optical force will behave based on the configuration of the meta-material supercell structure and if the movement and speed of the solar sail can be determined by depending on the weather pushing or pulling force is obtained. In our result, we were able to obtain optical force values in three different axis and identified pulling force based on the proposed supercell structure and show results based on simulation data. Our research clearly demonstrated the impact in optimal force based on varying supercell structure and may lead to further investigation to improve movement and speed of the solar sail.