

# Fabrication of Printed Microstrip Patch Antennas

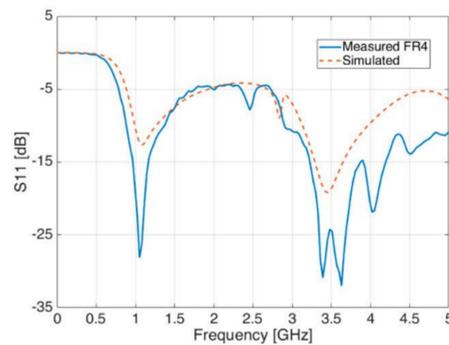
## Introduction

- The goal of this project was to learn about antenna design, how to simulate antennas, and fabricate and measure an antenna
- A paper was selected with a design for a dual frequency microstrip blade antenna
- A ~20mm x ~60mm blade antenna with a C shaped slot

Fabricated Antennas using copper tape

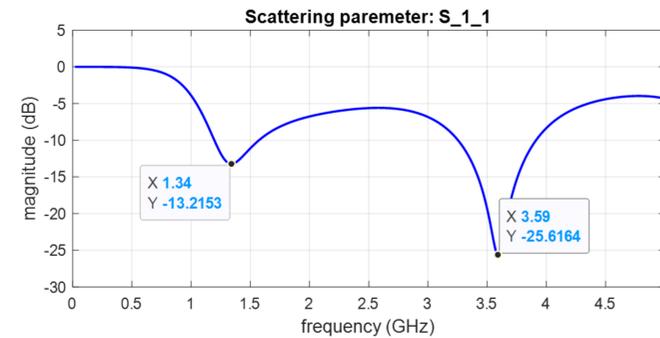


## Original Data



Blade Antenna Data from reference [1]

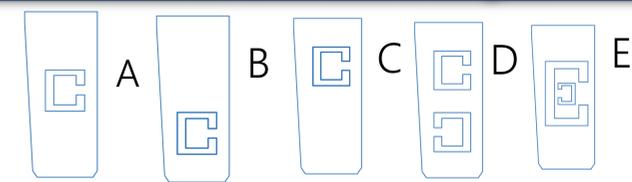
## Simulation Results



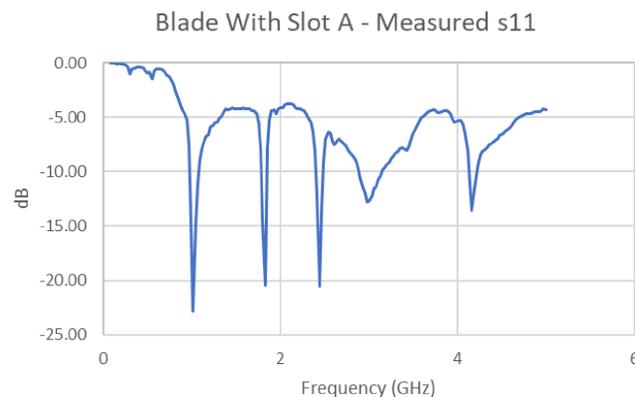
Simulation results of Blade with Slot A. Based on [2]

Our simulation data matches the published paper very closely, however, our simulations indicated that the slot did not have a large impact on the performance of the blade antenna

## Future Antenna Designs

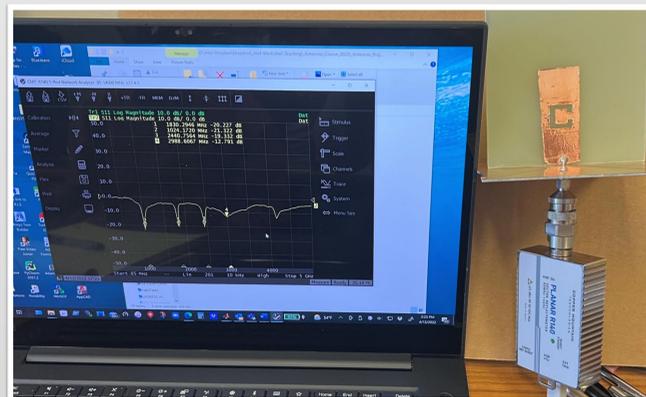


## Measurement Results



- The fabricated antennas are measured
- Blade with slot showed more pronounced resonances in the 1-5 GHz range.
- We found inconsistencies between simulations and measurements
- These inconsistencies are now being investigated to determine if it is due to fabrication errors, inaccuracy of substrate material properties, or errors in setting up the simulation parameters.

## Measurements setup



## Conclusion

- We found that the simulated antennas had comparable results to the published data.
- In our primary simulations, however, we found that the placement and shape of the slot had minimal impact on antenna performance.
- Our fabricated antennas do not produce the expected results.
- Further investigation is underway to perfect the fabrication and to repeat the measurements.

## Future Work

- We would like to test and fabricate all of the antenna designs seen in the Future Antenna Designs section above.
- Figure out the disconnect between simulation and measurement data of fabricated antennas.

## References and Acknowledgements:

- Acknowledgements:**  
Authors would like to thank Robert Jones for his help in the fabrication and measurements of the antennas.
- References:**  
[1] M. J. Arpaio, G. Paolini, F. Fuschini, A. Costanzo, and D. Masotti, "An All-in-One Dual Band Blade Antenna for ADS-B and 5G Communications in UAV Assisted Wireless Networks," *Sensors*, vol. 21, no. 17, 2021, doi: 10.3390/s21175734.  
[2] V. Demir and A. Elsherbeni, "Computational Electromagnetics Simulator (CEMS)," software package version 4, veysdemir@gmail.com, August 2020.