GUI FOR DESIGN OF HELICAL ANTENNA (MINI PROJECT)

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Fundamentals of Helical Antenna

A helical antenna is a type of radiofrequency (RF) antenna that is characterized by its helix or spiral shape. It is widely used in various applications, including communication systems, satellite communication, radio astronomy, and radar systems. The helical antenna offers several advantages, such as broadband performance, circular polarization, and high gain, making it suitable for both transmitting and receiving signals.

The Project

The project aims to develop a Graphical User Interface (GUI) for the design and analysis of helical antennas, leveraging the capabilities of GNU Octave for numerical computations and CST (Computer Simulation Technology) for electromagnetic simulation.

Technological Stack

GNU Octave

Utilized for numerical computations, mathematical modeling, and optimization algorithms.

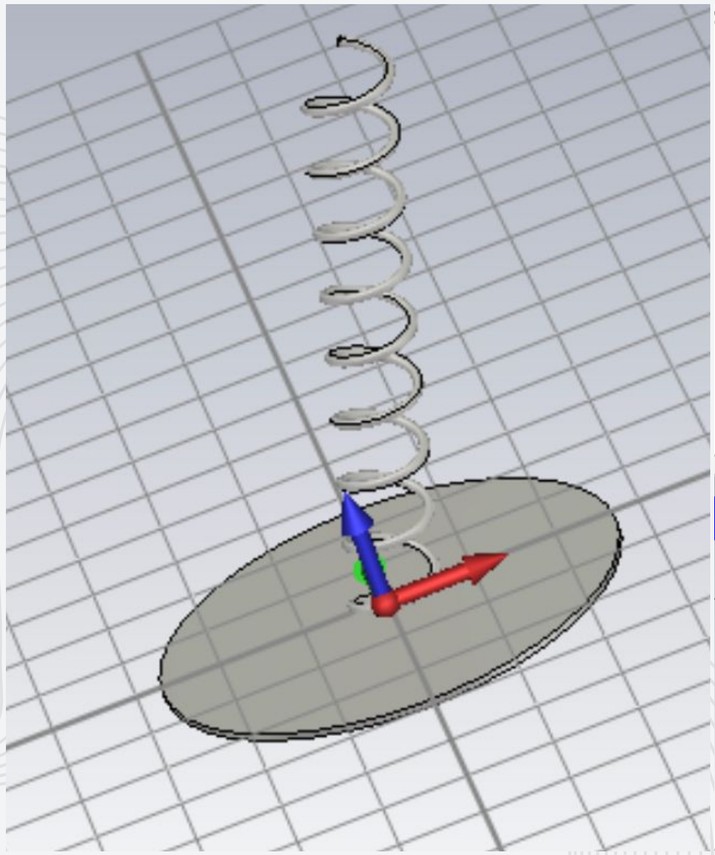
CST (Computer Simulation Technology)

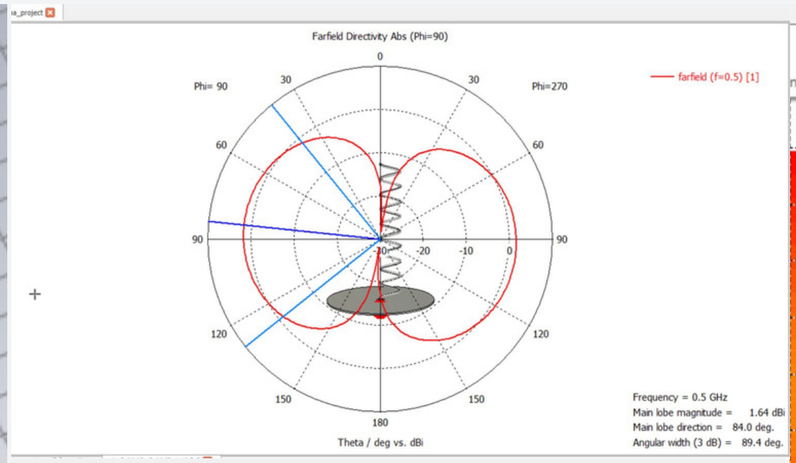
Used for electromagnetic simulation and analysis of the helical antenna.

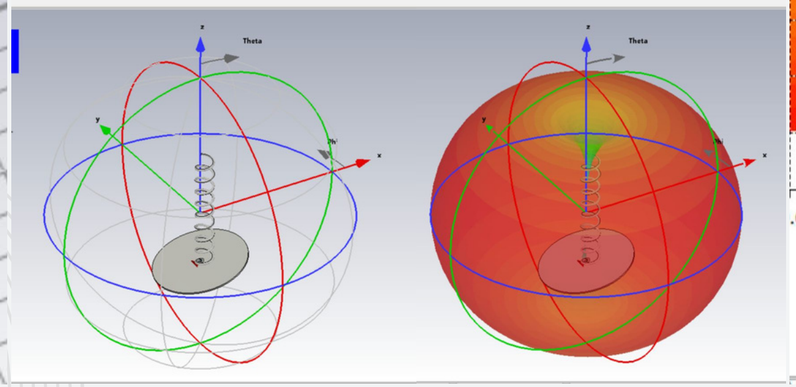
GUI USING CST

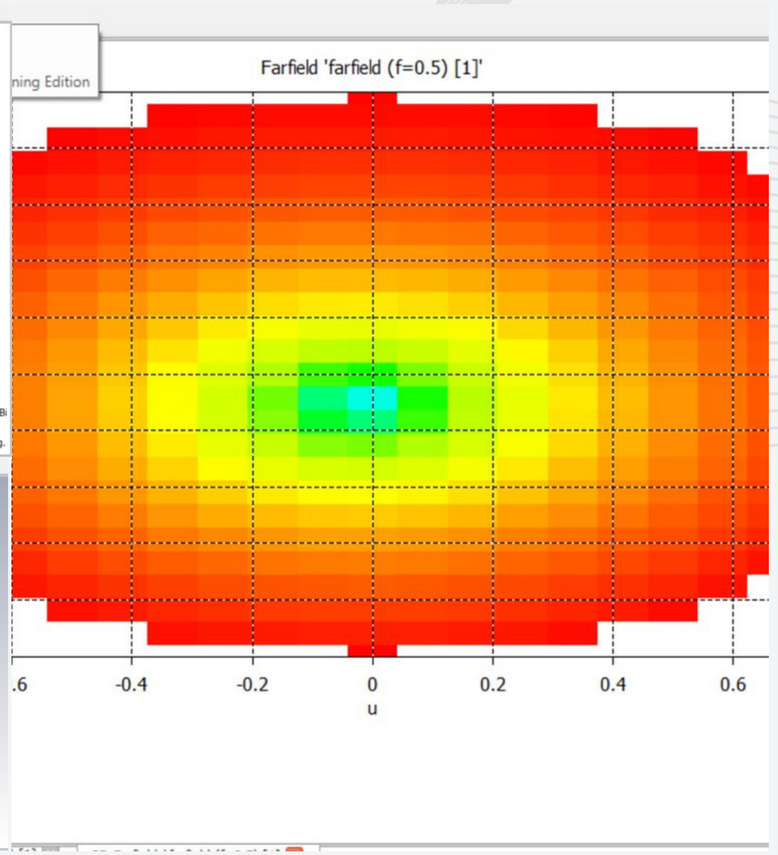
Using CST, we tried to provide a basic visualization of the helical antenna. The radiation pattern in 2D and 3D is also shown using this tool.

Code Link: https://drive.google.com/file/d/1ZJjPC7Kp4a4jEDYDPl8eODIRwCAD1xiJ/view?usp=sharing



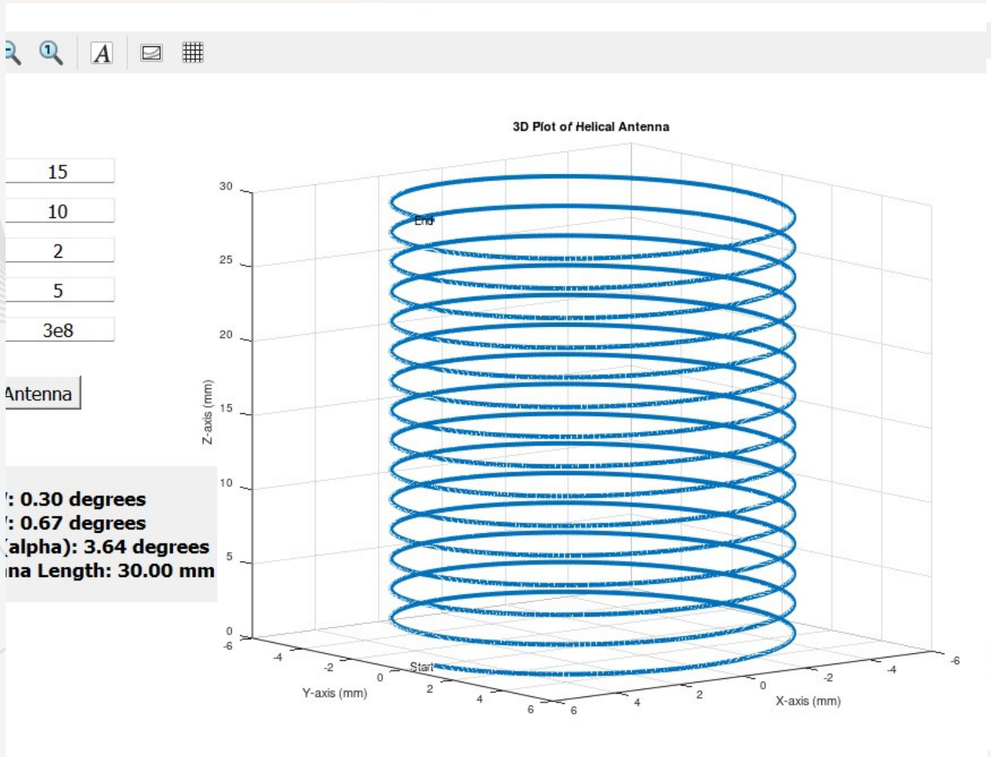


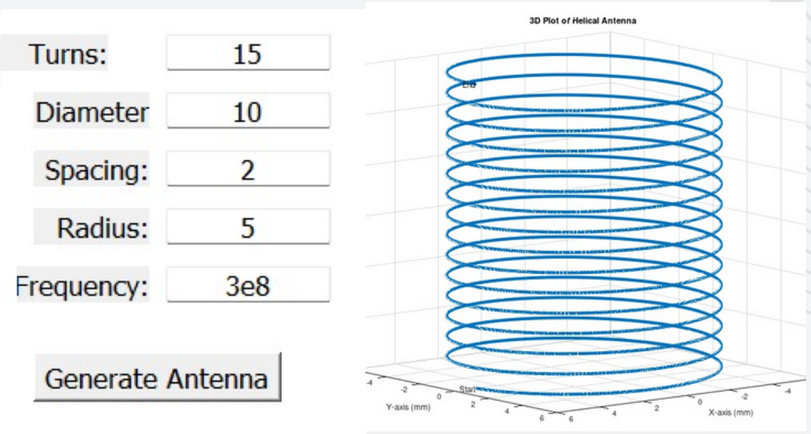




GUI USING GNU OCTAVE

GNU Octave gave us a platform to show the helical antenna model in 2D. The user was given the freedom to choose their own number of turns, diameter, frequency, and spacing between the turns. The antenna is designed accordingly with the calculation of HPBW, FNBW, Pitch angle, and antenna length.
Code Link: https://drive.google.com/drive/folders/1OfJPO6VsX26zB85h-IO-MzUaloDRoO5L?usp=sharing

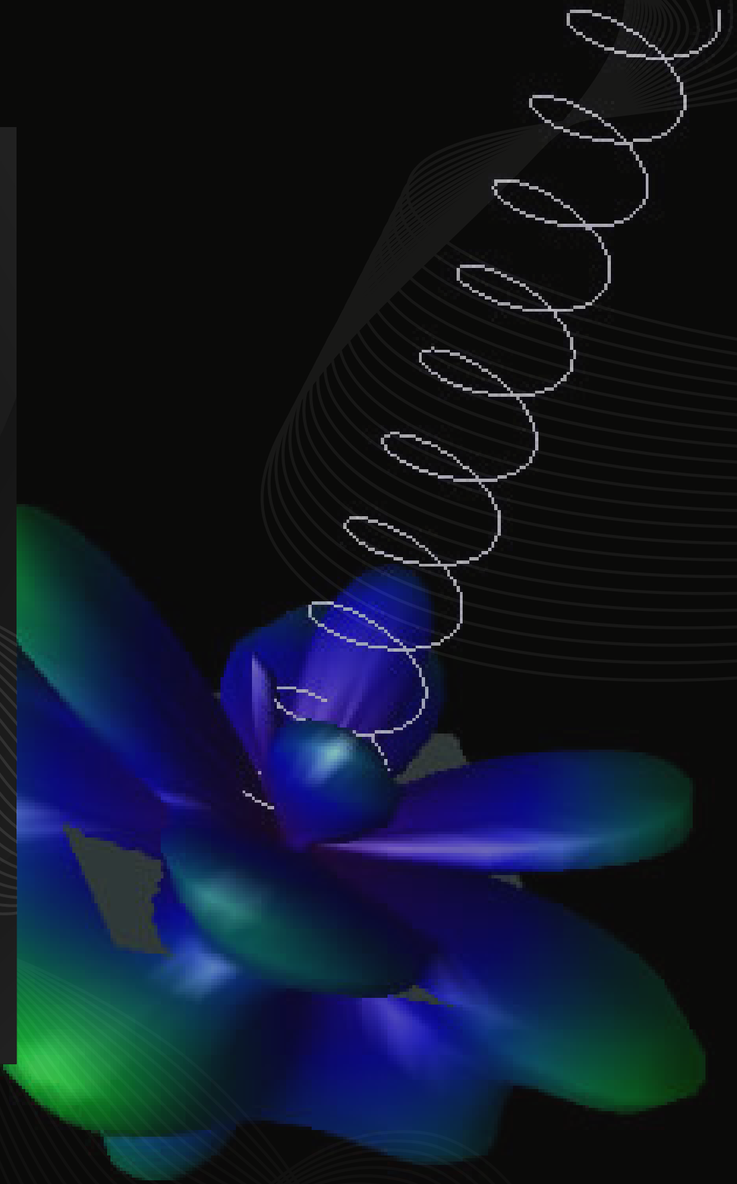


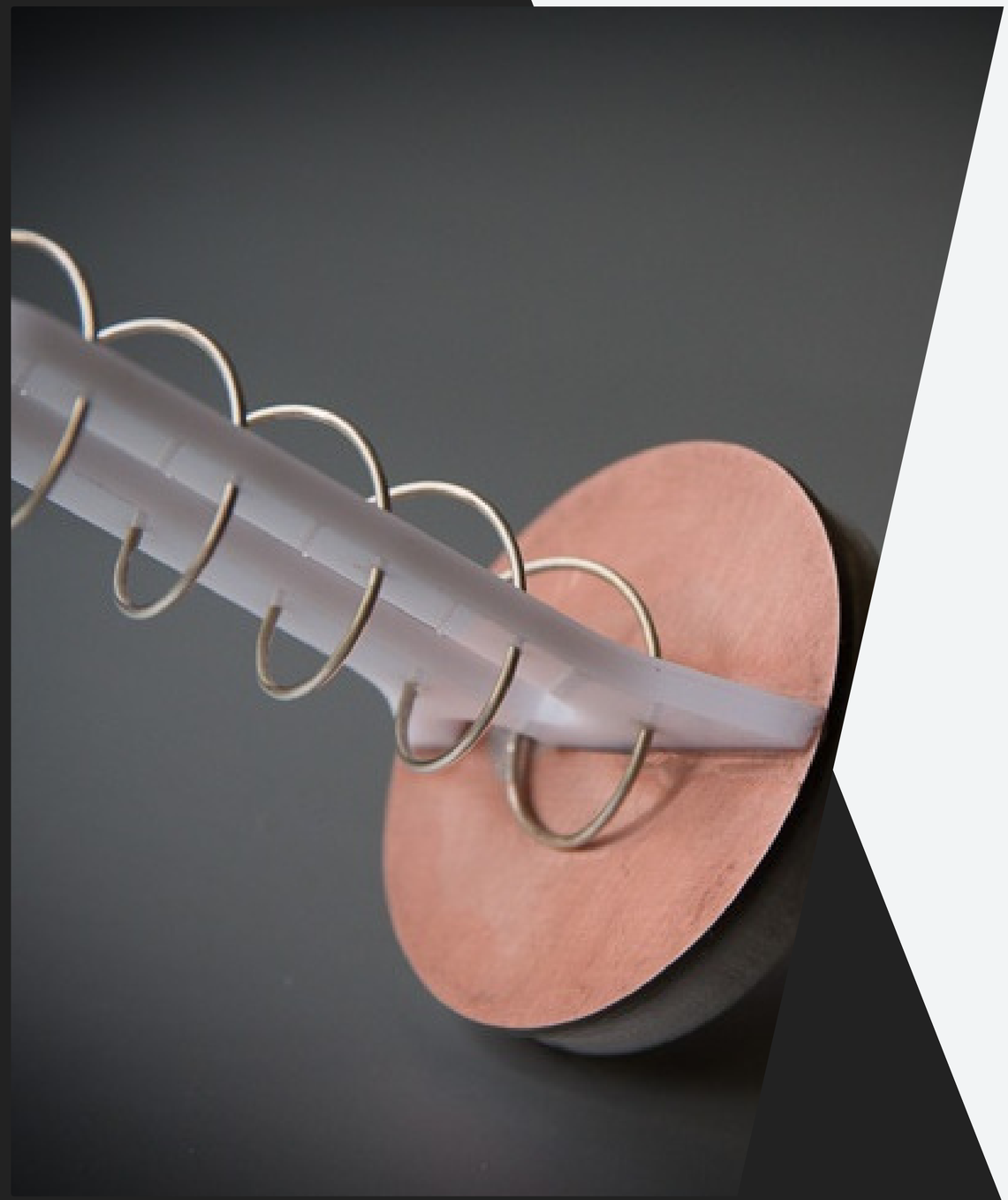


HPBW: 0.30 degrees
FNBW: 0.67 degrees
Pitch Angle (alpha): 3.64 degrees
Helical Antenna Length: 30.00 mm

CHALLENGES FACED

- CST was a new software to learn for our team. So it was a challenge to develop the whole project in 3D with such accuracy.
- The reduction of elements in CST was a major problem for us as we had only a student learning tool.
- In GNU, we faced some problems in the positioning of different elements in the workspace.





Thank You

Team

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