Program Profile		
Program	Program name	Simple Feed Tri-Polarized Microstrip Antenna Technology Incorporating Strip-Slot Divider for Next-Generation Wireless Communication and Sensing
	Category	B6-Digital Transformation

Summary of Program	
Program Name	Simple Feed Tri-Polarized Microstrip Antenna Technology Incorporating Strip-Slot Divider for Next-Generation Wireless Communication and Sensing
Category	B6-Digital Transformation
Abstract of Program	The goal of this program is to improve contemporary wireless communication and sensing systems by designing and developing a tri-polarized microstrip antenna. This invention offers three polarization modes: Left-Hand Circular Polarization (LHCP), Right-Hand Circular Polarization (RHCP), and Linear Polarization. Conventional antennas usually only offer single or dual polarization. Switching or combining these modes greatly increases spectrum efficiency, decreases multipath fading, and increases channel capacity. 5G, IoT, satellite communication, and intelligent sensing platforms are among the next-generation applications for which the antenna is optimized. It is feasible for integration into portable devices, base stations, and developing sensing systems because to its straightforward feed structure, which permits compact design, ease of production, and cost-effectiveness. Through the use of tri-polarization, the antenna offers improved resilience against interference, adaptable performance in a variety of settings, and increased connection reliability. The antenna has significant advantages for sensing applications, including biomedical detection, environmental monitoring, radar, and disaster management, in addition to communication. Polarization variety contributes to safer and more intelligent societies by increasing detection accuracy and guaranteeing reliable operation in complex and dynamic circumstances.

Details of Program		
Planning		
Objectives	Long-term Goals	▪ Make the university a center of expertise in antenna research. ▪ Support national and worldwide 5G/6G communication infrastructure. ▪ Encourage industry-academic collaboration on breakthrough wireless technology.
	Short-term Targets	▪ Finish designing and testing an antenna prototype within a year. ▪ Publish the results in conferences and journals with indexes. ▪ File for the rights of the antenna design's intellectual property.
	Rationale	Innovative antenna designs are required due to the growing demand for faster data rates and dependable wireless communication. By addressing the drawbacks of traditional antennas and providing more flexibility, fading resistance, and throughput, the tri-polarized microstrip antenna advances next-generation networks.
Subject (Leader)	Initiator(s)	DAS, Debprosad
	Champion(s)	DAS, Debprosad

	Major team member(s)	Research Team of Department of EEE, World University of Bangladesh
Environment	Nature/Society	The initiative addresses society's need for dependable communication in smart cities, disaster response, and rural connectivity.
	Industry/Market	Wireless service providers, IoT device manufacturers, and satellite firms all require sophisticated antenna solutions to increase efficiency.
	Citizen/Government	The government's goal for digital transformation and smart connection stimulates the use of new wireless technologies.
Resources	Human resources	Skilled faculty, graduate researchers, and industry specialists collaborate.
	Financial resources	The university will provide seed funds, with the potential for grants and industrial sponsorship.
	Technological resources	Advanced antenna design software, fabrication labs, and testing facilities.
Mechanism	Strategy (Weight/Sequence)	▪ Research and simulation (High priority) ▪ Prototype fabrication ▪ Performance Evaluation and Optimization ▪ Industry collaboration for deployment.
	Organization	With assistance from the university's innovation center, the program is carried out by the Department of Electrical and Electronic Engineering.
	Culture	University encourages research-led innovation, patent filing, and industry partnerships.
Doing		
Launch date		January, 2025
Responsible organization		Department of EEE, World University of Bangladesh
Program content and process		A thorough literature study and simulation studies utilizing ADS, CST, and HFSS tools are the first steps in the project. The antenna will be manufactured and tested in an anechoic chamber when the design has been refined. The findings will be examined, recorded, and disseminated via papers and conferences. To guarantee practical implementation, technology transfer conversations with industry partners will be started.
Key highlights of the content/process		▪ A new capacity for tri-polarization. ▪ Small and economical design. ▪ A 5G and beyond industry-ready prototype.
Differences from traditional approaches		Only single or dual polarization is offered by conventional microstrip antennas. This program increases data performance and multipath resilience by introducing triple polarization in a compact architecture.
Progress as of today		Simulation studies are finished, and the manufacture of prototypes has begun.
Problems in implementation		Tri-polarization is difficult to achieve without sacrificing bandwidth.
Approaches to solve the problems		Advanced substrate materials and optimization algorithms are being investigated.
Completion date, if completed		Ongoing.
Seeing		

Impacts on students	Students have practical experience with simulation, prototyping, and antenna design.
Impacts on professors	Increases scholarly visibility through commercial partnerships, patents, and publications.
Impacts on university administration	Establishes the university as a pioneer in the study of wireless communication.
Responses from industry/market	Positive first responses from players in the wireless industry.
Responses from citizen/government	The effort is in line with the government's desire to encourage digital innovation.
Measurable output (revenues)	Potential income from antenna technology licensing.
Measurable input (expenses)	The initial budget estimate for software, fabrication, and testing is between $30,000 to $50,000.
Cost-benefit analysis for effectiveness	Because of the technology's scalability, anticipated long-term benefits exceed initial expenditures.
Future Planning	
Where does the project go from here?	The antenna technology will be finished, patented, and presented to business partners for eventual commercialization. mmWave and terahertz applications for 6G networks will be the main emphasis of future generations.
Addendum	
Exhibits, pictures, diagrams, etc.	Antenna design schematics, simulation results, prototype images (to be attached).
Reports, mimeos, monographs, books, etc.	Research papers and technical reports.
Others which may help explain the program (including website links)	