

LIST OF ABBREVIATION

- ADC : Analog-to-Digital Converter – Converts analog radar signals into digital form for further processing.
- BPF : Band-Pass Filter – Allows a specific frequency band to pass, rejecting signals outside this range.
- CRI : Complex Refractive Index – A model used for estimating dielectric properties of heterogeneous materials.
- dB : Decibel – A logarithmic unit used to express signal gain, loss, or power levels.
- dBm : Decibel-milliwatts – A unit that measures power referenced to 1 milliwatt.
- FFT : Fast Fourier Transform – An algorithm to convert time-domain radar signals into frequency domain.
- FMCW : Frequency-Modulated Continuous Wave – A radar technique that modulates frequency over time for target distance estimation.
- GUI : Graphical User Interface – Interface that uses visual indicators for user interaction.
- Hz : Hertz – The unit of frequency, equal to one cycle per second.
- IF : Intermediate Frequency – A downconverted signal from the original carrier to a lower, processable frequency.
- IoT : Internet of Things – Interconnected devices capable of collecting, exchanging, and transmitting data.
- IDFT : Inverse Discrete Fourier Transform – Used to convert frequency domain radar data into time domain.
- LPF : Low-Pass Filter – A signal filter that passes signals with a frequency lower than a selected cutoff.
- MAPE : Mean Absolute Percentage Error – A performance metric used to evaluate prediction accuracy.
- MATLAB : Matrix Laboratory – A numerical computing environment widely used for simulations and data analysis.
- OBIA : Object-Based Image Analysis – Image analysis method using object segmentation rather than pixel-based detection.
- PRI : Pulse Repetition Interval – The time interval between successive radar pulses.

RAM : Radar Absorbing Material – A material that minimizes radar wave reflections, often used in testing setups.

RF : Radio Frequency – Electromagnetic wave frequencies typically ranging from 3 kHz to 300 GHz.

R^2 : Coefficient of Determination – A statistical measure indicating how well data fit a regression model.

ROI : Region of Interest – A specific area selected for focused analysis, often in image or radar data.

SAR : Synthetic Aperture Radar – High-resolution radar imaging using the motion of the radar antenna over a target.

SFCW : Stepped-Frequency Continuous Wave – A radar method that sends multiple discrete frequencies for high-resolution measurements.

SNR : Signal-to-Noise Ratio – Ratio of the power of a signal to the power of background noise.

STEM : Science, Technology, Engineering, and Mathematics – An interdisciplinary approach in education and research.

UAV : Unmanned Aerial Vehicle – Commonly known as a drone, used for aerial data collection.

VCO : Voltage-Controlled Oscillator – A component in radar systems that generates frequencies depending on input voltage.

VNA : Vector Network Analyzer – A device used to measure S-parameters like S11 and S21 in radar systems.

GSD : Ground Sample Distance – The real-world size (in meters) represented by one pixel in an image.

SSIM : Structural Similarity Index Measure – A metric that measures the similarity between two images based on structure, brightness, and contrast.