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Name: **Dr. Virendra Singh Rathore (Principal Investigator)**

Department: **Remote Sensing & Geoinformatics**

Project Title: **Quantifying the Fire Impact and Forest Resilience using NISAR dataset.**

Funding Agency: **SAC, ISRO (Space Applications Centre)**

Sanction Amount: **2493000**

Fund Utilised.: 0

Tenure: **3 Years**

Abstract:

The primary objective is to exploit the unique dual-frequency (L- and S-band) and polarimetric capabilities of the NASA-ISRO Synthetic Aperture Radar (NISAR) mission to: (i) quantify vegetation physiognomy and growth characteristics across varying forest densities and biomass conditions; (ii) develop robust methods for delineating fire-prone zones and burned areas; and (iii) assess post-fire forest resilience through spatio-temporal recovery analysis.

The study will be conducted in Bandhavgarh National Park and Dalma Wildlife Sanctuary, representing contrasting tropical forest ecosystems. Major datasets include NISAR backscatter, polarimetric and interferometric products; active fire points from NASA FIRMS; burned area maps from MODIS MCD64A1 Burned Area Product; Cartosat DEM; CHIRPS rainfall; soil moisture; and optical satellite observations. Key indices and parameters include radar vegetation and moisture indices, entropy, texture, coherence, and polarimetric decomposition variables. The methodology integrates time-series SAR processing, empirical modelling, and terrain-climate stratification to estimate biomass, degradation, fire severity, and resilience. The project will deliver calibrated algorithms, geospatial databases, resilience maps, peer-reviewed publications, and operational decision-support tools for forest scientists, ecologists, and forest management agencies.